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## **Agricultural Information Worldwide:**

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# — Agricultural Information Worldwide —

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***Special Conference Issue on IAALD Montpellier Meeting***

## INTRODUCTION

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**T**he IAALD XIIIth World Congress, “Scientific and Technical Information and Rural Development: Highlights of Innovative Practices”, organized by Agropolis International, 26–29 April 2010, Montpellier, France, brought together 255 practitioners from 55 countries around the world involved in the production, management, distribution or use of knowledge in the agricultural and rural development sectors. Together, these practitioners and users exchanged information about new practices to support research, action and innovation for sustainable rural development.

This is the first of two special issues of *Agricultural Information Worldwide* dedicated to sharing highlights of this conference. Ten papers have been selected for this issue which follows the five broad themes of the conference.

**Theme 1: Innovative learning processes** — Two papers document agriculture related training platforms and communities of learning from experiences in Brazil and Senegal and Cameroun in West Africa. Both papers show how different learning methodologies were used to empower stakeholders at the community level so they could have a more significant role and voice in agriculture and rural development decisions affecting their lives. The role of local or traditional knowledge in mixed or formal knowledge systems for innovation is explored.

**Theme 2: Targeted information products and services** — These papers look at the provision of information products and services from different institutional perspectives. One perspective is from an organization dedicated to improving information and communication management capabilities of agricultural and development organizations worldwide. A second perspective is from a public university dedicated to providing research information services to the university community and focuses particularly on the future for traditional abstracting and indexing services. Both perspectives conclude that targeted information products and services must be based on user preferences, needs and priorities and that information providers at all scales need to continuously monitor, learn from other actors and adapt and improve their products in order to remain viable.

**Theme 3: Communication and information exchange between actors** — These papers explore the challenges to use of communication tools to promote innovation and rural development and document training processes used

to strengthen the capacity of target audiences to create, adapt, add value to and/or use relevant information. One paper focuses on use and adaptation of an existing mixed media information tool in the livestock production sector in Tanzania while the second paper focuses on training farmers and practitioners working in agroecology to analyze and document their own knowledge and practices so their experiences can be more widely disseminated and used through formal and informal communications channels. Similar to the papers in Theme 2 both authors agree on the importance of continuous monitoring and analysis of results to ensure relevance and uptake of products and on the importance of field-based generation of knowledge and local experience to complement formal knowledge.

**Theme 4: Integrated information systems** — The papers in this session focus on information portals in the agricultural domain from a national perspective and a global perspective. One paper focuses on the process to develop a national integrated scientific information system to inform public policy on agricultural research in Algeria. The second paper examines the process and results of developing a global, multi-institutional portal to share best practices for managing crop genetic resources and making decisions about gene bank management. Common challenges and issues are explored such as managing partnerships, virtual collaboration, training and communication for remote content development, among the dispersed community, quality control and sustainability of the portal.

**Theme 5: Information as a public policy enabler** — Both papers deal with the issue of strengthening the effectiveness and capacity of national research systems in the context of increasing investment in agricultural science and technology through improved communications. One paper discusses strategies used by a global initiative to communicate agricultural science and technology indicators on institutional developments, investment capacity trends at global, regional and national levels while the second paper calls for the urgent need to strengthen capacity to document and communicate experiences and lessons learned from development projects in West Africa in order to stimulate further innovation for rural development.

Elizabeth Goldberg, Guest Editor  
20 September 2010

# How Can Information Contribute to Innovative Learning Processes? Insight from a Farmer University in Brazil

Emilie Coudel, Jean-Philippe Tonneau

**EDITOR'S NOTE:** Paper presented at the IAALD XIIIth World Congress, Montpellier, 26–29 April 2010 Scientific and Technical Information and Rural Development

**ABSTRACT:** Faced with the challenge of inventing new ways towards sustainable development, the capacity of societies to innovate appears as fundamental. A common assumption is that making more information available will encourage actors to develop new solutions. However, although science has never produced as much information as today and stakeholders have never had access to as many sources of information, this quantity of information sometimes appears as illusory. In fact, relevant information is often crushed by quantity, and stakeholders feel disabled faced with so much information, blocking their capacity to act. Moreover, among the increasing quantities of scientific and technical information, many are of limited application, having been produced in very specific contexts. Information cannot be used because it is not adapted and appropriated by the actors. It is necessary to invent new ways of mobilizing information in specific situations and develop the capacity of stakeholders to do so.

Literature often presents information as a key element of learning processes to enable innovation in development projects. Different learning theories formalize such processes, in which information is part of a dynamic cycle: actors construct new knowledge and develop competencies to then better use available information within ideal learning organizations or learning communities. But in practice, what are the factors which encourage such learning and innovative processes, in which information truly fosters innovation?

To contribute to reflexion, we will bring insight from a Rural University (Universidade Camponesa - UniCampo), which aimed at developing the capacities of community leaders in a territory of the semi-arid region of Brazil. Information, in such territories, raises some particular issues. Often, social and economical information is the monopoly of traditional elites, who still dominate politically these regions. Adequate agronomical information is inexistent, being only available for productive zones. Moreover, local knowledge detained by the populations is often disdained, the banks and technical advisory services imposing their views.

At UniCampo, a collective reflexion was engaged to discuss development models and suggest new ways. Information adapted to the context was produced through research and experimentation, simultaneously reinforcing the actors' knowledge and skills. The information build during this process, considered as legitimate by the actors involved as well as by other institutions in the territory, was used to suggest new development projects. Thus empowered, the community leaders started asking to be informed about the development policies in the territory, laying claim to accountability. Although several limits can be pointed to, the overall assessment of this experience shows that by enhancing the links between information systems, capacity build-

ing and governance systems, actors can learn to better mobilize and produce information and thus suggest innovative ways for the sustainable development of their territory.

**RÉSUMÉ:** Pour répondre au défi d'inventer de nouveaux modes de vie pour le développement durable, la capacité d'innovation des sociétés apparaît essentielle. Une affirmation commune est que l'information disponible favorise la recherche de ces nouvelles solutions. Cependant, bien que la science n'ait jamais produit autant d'information qu'aujourd'hui et que les acteurs n'aient jamais eu accès à autant de sources d'information, l'information disponible apparaît parfois illusoire. En fait, l'information pertinente est comme noyée par la quantité et les acteurs semblent écrasés par cette information, qui bloque leur capacité d'action. Une grande partie de l'information scientifique et technique est d'application limitée, car produite dans des contextes très spécifiques. L'information ne peut pas être utilisée parce qu'elle n'est ni adaptée aux situations, ni appropriée par les acteurs. Il semble nécessaire d'inventer de nouvelles manières de mobiliser l'information pour répondre à des situations toujours spécifiques et de développer la capacité des acteurs pour le faire.

La littérature présente souvent l'information comme l'élément principal des apprentissages qui permettent l'innovation dans des projets de développement. Différentes théories de l'apprentissage formalisent ces processus. L'information est "moteur" d'un cycle vertueux : les acteurs construisent de nouvelles connaissances et développent des compétences pour mieux utiliser l'information disponible au sein de communautés d'apprentissage. Mais dans la pratique, quels sont les facteurs qui permettent de tels processus d'apprentissage, où l'information stimule vraiment l'innovation ? Pour contribuer à la réflexion, nous analyserons une expérience d'université paysanne (Universidade Camponesa - UniCampo), qui a cherché à développer les compétences de responsables communautaires dans un territoire de la région semi-aride du Brésil. L'information, dans de tels territoires, renvoie à des défis particuliers. L'information sociale et économique est le monopole des élites traditionnelles, qui dominent toujours politiquement ces régions. L'information agronomique adaptée aux situations est inexistante, car produite et importée des zones plus productives. Les savoirs et connaissances locales sont largement méprisés, les banques et les services d'appui techniques imposant leurs vues.

À l'UniCampo, une réflexion collective a été engagée pour discuter des modèles de développement et suggérer de nouvelles manières de produire. Une information adaptée au contexte a été produite par la recherche et l'expérimentation, renforçant à la fois les connaissances et compétences des acteurs. L'information produite est considérée comme légitime par les acteurs impliqués mais aussi par les différentes institutions et organisations du territoire. Elle a été utilisée pour définir de nouveaux projets de développement. Renforcés, les leaders communautaires ont revendiqué un droit de regard sur les politiques de

développement dans le territoire. Bien que plusieurs limites aient été identifiées, l'évaluation globale de l'expérience démontre que l'implication dans des processus qui allient systèmes d'information, renforcement des compétences et gouvernance, favorise les processus d'apprentissage et permet aux acteurs de mobiliser et produire de l'information pertinente et d'inventer de nouvelles voies pour le développement durable de leur territoire.

**RESUMEN:** La literatura a menudo presenta la información como un elemento clave de procesos de aprendizaje para permitir la innovación en proyectos de desarrollo. Diferentes teorías de aprendizaje formalizan dichos procesos, en los cuales la información forma parte de un ciclo dinámico: los actores construyen nuevo conocimiento y desarrollan competencias para luego utilizar mejor la información disponible dentro de organizaciones o comunidades de aprendizaje ideales. Pero, en la práctica, ¿cuáles son los factores que promueven dichos procesos de aprendizaje y de innovación? ¿Cuál es la información que verdaderamente fomenta la innovación? La Universidade Camponesa (UniCampo) buscó desarrollar las capacidades de los líderes comunitarios en un territorio de la región semiárida de Brasil. La información en dichos territorios plantea algunos

temas particulares. A menudo, la información social y económica es monopolizada por las elites tradicionales, que todavía dominan políticamente estas regiones. La información agrícola adecuada, aunque disponible para las zonas productivas, no existe para la región seleccionada. Es más, el conocimiento autóctono retenido por las comunidades locales es, a menudo, menospreciado por los bancos y los servicios de asesoría técnica que imponen sus puntos de vista. En UniCampo se celebró una consulta de diversos grupos de interesados directos para tratar los modelos de desarrollo y sugerir nuevas maneras de intercambio de información. Se produjo información adaptada al contexto mediante la investigación y la experimentación, reforzando simultáneamente los conocimientos y las habilidades de los actores. Empoderados de esta manera, los líderes comunitarios empezaron a solicitar que fueran informados acerca de las políticas de desarrollo en el territorio. A pesar de diversas limitaciones, la evaluación general de esta experiencia indica que al mejorar los vínculos entre sistemas de información y sistemas de fortalecimiento de capacidades y de gobernanza, los actores pueden aprender a movilizar y producir información mejor y sugerir, por lo tanto, maneras innovadoras para el desarrollo sostenible de su territorio.

## Introduction

**Sustainable development** is not an obvious policy to put into practice. It is a real challenge to change ways of life, production and management. Will we be able to do so? Every day, the complexities and difficulties of dealing with the contradictory objectives of production, preservation and social equality prove that sustainable development requires innovation to change thinking, to deal with uncertainty, to invent new processes and to adapt to change (Hall and Vredenburg, 2003; Veldkamp et al., 2009).

Scientific and technical information has a central role in innovation processes. For example, one of the main objectives of “innovation poles” has always been to promote the exchange of knowledge and know-how through networking and dissemination of scientific and technical information.

The concept of “Information Society” (Petit, 1998) which emerged in the 1990's, highlights both the dramatic increase in scientific and technical information and the extraordinary development of technological tools to better manage this information, classify it, diffuse it and target potential users. However, it appears more and more clear that the available information is not fully used in decision processes, in particular, to implement sustainable development. The information is usable, in the sense that it exists in an attractive form, but is it relevant and useful for the stakeholders? Do they have the capacities to mobilize it? And do their environments provide the conditions that enable them to use it?

These questions are partly reflected in the concept of “Knowledge Society” (Foray, 2004), in which scientific and technical information is not a product to be implemented but the basis for a capacity building process that can lead to innovation. Our purpose is to analyze under

what conditions scientific and technical information may contribute to these processes. We will first identify the limits of the current model of information production and knowledge management and will discuss the importance of their integration in learning processes. We will then explore theoretical elements to understand the roles of information in the learning process. Using the case of a Farmer University in Brazil, we will illustrate how information production has been used to enhance the learning processes and enable the stakeholders to design projects for sustainable development.

With this insight, we hope to contribute to thinking about new ways of associating information production and capacity building within a shared learning process.

## The limits of the current model

**A massive production of scientific and technical information, but with what result?** – Innovation is often presented as the product of interactions between research and stakeholders. In this interaction, scientific and technological information has a central role. In recent years, the flow of scientific and technological information has increased continuously. There have never been as many researchers, nor as many resources (NSB - National Science Board, 2010). Scientific output has multiplied. Furthermore, with the advent of Internet and with English as a common communication language, opportunities for access to information have increased dramatically.

However, it cannot be ignored that under-development and its consequences (resource crisis, industrial pollution, poverty, exclusion, etc.) are still present. We are reminded every day, with continual debates and declarations, about the limits of our development model: economic limits, environmental limits, social limits.

How can this paradox, between high productivity of

science and its low efficiency, be explained in terms of sustainable development? Has science become isolated, has it been cut off from reality, as some suggest? But science has never ever been as attentive to social demand (Grossetti, 2000) nor as preoccupied with its utility. According to Gibbons et al. (1994), scientific research is now mobilized by industry and governments to resolve issues.

If we consider science in reference to the overall social transformation process (Bessis, 1995), our hypothesis is that science is too often mobilized on technical issues and does not take into consideration the requirements of sustainable development nor the impact of evolving conditions such as climate change. Science is often limited to useful or utilitarian research, designed for specific applications, but with no real capacity to address the future. Achieving a social consensus on the ultimate aims of development of the society is a prerequisite for defining the technical interventions to reach those aims. Science is not only about inventing new technologies; it must also be involved in helping to guide social transformation and its aims.

**The challenge of making information usable but above all useful** – The challenge of the “information society” is to develop more efficient tools to store, share and reproduce information. Indeed, tools such as metadata, semantic web, intelligent agents, text-mining, or mapping systems, allow us to sort information intelligently and to better target its potential users. Usually, the purpose of these tools is to make information usable but this does not guarantee its usefulness.

Developing an efficient technical tool enables us to manage information, but the relevance of information may be at stake. And this relevance depends on the needs of the actors. The challenge is how to ensure the information meets a need which is often imperfectly or partially expressed. Will this information be useful? For whom is it relevant? Why is it relevant? Any information system designer faces the difficulty of mobilizing the potential users, both to make them express their needs and expectations (Reix, 1998) but also to bring this system to life by providing the necessary information. Such infor-

mation design is inseparable from an approach which places learning at its centre.

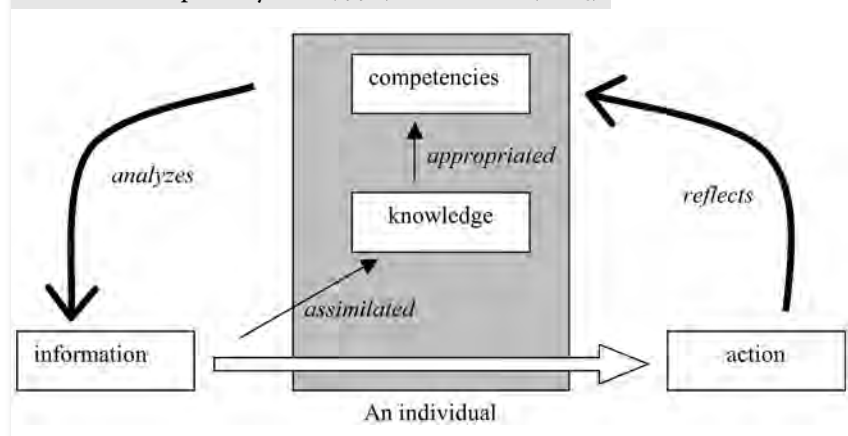
The notion of “knowledge society” associates information with learning: the issue isn’t only about quantities of information, but about how this information is used to create knowledge which can be used by stakeholders. In this concept, there is a difference between information and knowledge (Foray, 2004). Information is external to agents; it exists without them. It can be reproduced at almost no cost (for example, a photocopy of a book or a paper). On the other hand, knowledge is “internalized” information, that is, what an agent retains of that information and how he/she can possibly use it for future action. Knowledge only exists within the agent, in a tacit form. In this sense, knowledge is not reproducible without cost, and the cost is “learning”. Therefore, the challenge of the “knowledge society” is to encourage its agents to learn and develop new knowledge, using available information, and this will in turn create new information usable for others, through a dynamic learning cycle.

In this sense, information can become a tool for dialogue and debate, enabling users to take decisions for collective action. A group organized around a common project can become a “learning community” (Brown et al., 1989), within which a continuous learning process mobilizes information and produces competencies. The learning process is based on the assumption that no one knows where they are going and there is no pre-defined solution. The stakeholders are involved to learn and build the solution together. Encouraging such learning is always a challenge and there is no recipe. However, different theories provide a better understanding of these processes. We explore some of them in the following section.

## Information and learning processes: theoretical perspective

**Information as part of a knowledge cycle** – Learning, in psychology studies, is seen both as a cognitive process (acquiring knowledge) and a behavioural process (changing behaviours/practices through a trial and error process, learning in action). Learning can be formalized in a cycle, such as in organizational studies or knowledge management theories (Reix, 1998; Rivoire, 2004) where information becomes knowledge as it is internalized, and knowledge becomes competency as it is appropriated. In our sense, competency is the capacity to act according to a given situation and to decide what knowledge to mobilize in this situation. Figure 1 represents this cycle. It is important to understand

FIGURE 1 – Information and the knowledge cycle (by the authors, inspired by Reix (1998) and Rivoire (2004))





the components as being part of a common learning process.

Information is an important element of this knowledge cycle, and can be used in different ways, implying various learning processes:

- 1) At the simplest level, an individual receives information and acts accordingly, almost by reflex.
- 2) *Information that is internalized* by an individual, becomes knowledge, and can then be used later to carry out actions.
- 3) By reflecting on the result of these actions, the individual will learn to adapt his knowledge to the situation, developing competencies. He is then capable of *giving meaning to the information* available.
- 4) According to his needs in a given situation, an individual can *search for information* from his environment to help guide his action.
- 5) An individual can also *create new types of information*, if none is available which fits his needs. For this, he needs some vision of what information he wishes.

In these different processes, there is an increasing interrelation between the actor and his environment, which frees him from existing information and enables him to produce the information necessary to his action. It is through this process that adaptation or innovation capacity can be created.

Learning loops theory helps to explain the complexity in the relationships with information according to the works of Bateson (1972) for individual learning or Argyris and Schön (1996) which formalizes group learning processes. Single-loop learning occurs when new knowledge is acquired and transformed with the aim of improving a process. Double-loop learning goes further: new knowledge is used to gain a new perception of issues and problems, leading to a new way of solving them. More recently, some authors have added new loops (Romme and van Witteloostuijn, 1999): zero-loop learning occurs with a direct transfer of information, which does not imply true appropriation by the actors. In triple-loop learning, a group redefines itself and new collective frameworks, especially for learning together, which often gives them the possibility to challenge social rules or dominant paradigms and introduce new ones (Foldy and Creed, 1999; Turcotte et al., 2007).

This theory enables the actor to understand what type of information may be necessary in a given situation and what competencies the individuals or the group must build or mobilize to be able to act. In the case of a well defined project, single-loop learning is sufficient for carrying it out and the actors need *codified information* to build their knowledge and competencies from which they can suggest new *adapted information*. But when current strategies are not working, the actors need to define new ways of acting and new values. For this, they need information to build a common understanding within their group so they can interact more effectively.

We call this *framing information*. In a less well-defined project where there is a situation of uncertainty, as may occur in sustainable development, it may be necessary to develop triple-loop learning, to find new frameworks for thinking. And for this, actors need to be able to explore and build new information. We call this *exploratory information* is often based on *comparative information*. We will discuss these aspects in the next part.

**Learning to use and build information within projects** – Actors will mobilize different types of information, depending on the outcomes expected for their project, which will help them learn together and carry out the project. How to empower actors so that they are capable of using available information? How do they know what kind of information they need in a given situation? How can we encourage them to gather new information when necessary?

In our experience, these questions can be answered by understanding how the production of information is integrated into the learning process. There are two key questions: what information is needed for the project? And who is involved in the production of information?

In situations of uncertainty, actors' needs may change and require constant redefinition throughout the life of the project. Identifying this information is all the more difficult if power relationships are involved: all actors do not have the same interests or willingness to share information. In many situations, not only in developing countries, civic exclusion of a part of the population is a reality. The relationship with politics are crucial in many projects (Pasquier et al., 2007).

These issues raise the question of ethics. The concept of "citizen science" "recognizes individuals as authors of their decisions and capable of thinking or having control over their actions, whatever be the time and situation" (Bouilloud, 2000). This choice presumes a situation where knowledge production is democratized, within a "cognitive democracy" (Ghora-Gobin, 1993). The guiding principle is that no population should be excluded from the discussion around the project and that everyone should be able to participate in the design and choose how they wish to be involved. In concrete terms, the discussion is open to all and continuous throughout the project cycle.

Many donor institutions now base their programs on management theories (Dearden et Kowalski, 2003) which describe four steps of a project cycle:

- involving the actors
- helping the actors define a project
- implementing the project
- assessing the project and defining new orientations for the project

Each step corresponds to different learning dynamics, and therefore, requires different types of information. Empowering stakeholders to mobilize information is inseparable from enabling them to develop learning dynamics

TABLE 1 – Learning dynamics and information

Step	Learning dynamics	Type of information
<i>Involving the actors</i>	Actors must feel involved in the project and accept to engage in it with other actors ( <i>double-loop</i> )	<i>Framing information</i> : helps understand other points of view (language, context, etc.)
<i>Defining a project</i>	Once the group exists, the actors must develop the consciousness that they want to do a project, choose a direction, build values together ( <i>double-loop</i> ; towards <i>triple-loop</i> )	<i>Exploratory information</i> : evolution, tendencies, visions, wishes
<i>Implementing the project</i>	Actors must develop the competencies to implement the project, by acquiring knowledge ( <i>single-loop</i> )	<i>Codified and adapted information</i> : technical information adapted to the context, laws, regulations
<i>Assessing the project</i>	Actors must be capable of evolving, making a critical assessment and learning from it ( <i>triple-loop</i> )	<i>Comparative information</i> : before/after, this project/other project, meaning

during the process. This assumes that the conditions for this learning have been known: which actors, what type of facilitation, in what context, etc. In this process, information is both a condition to the learning and a result of the learning: if the appropriate information is available, it can enhance the learning, and through learning, the actors will be able to seek more information they need for their project. Table 1 presents step by step the dominant learning dynamics and type of information that is necessary for each step of the project.

The link between production of information and the learning process was studied in the Farmer University project, discussed below. This case provides useful insights on how to characterize the learning process and its impacts.

## Case of a Farmer University in Brazil

The Farmer University aims at developing the capacities of community leaders in a territory of the semi-arid region of Brazil. Information, in such territories, raises some particular issues. Often, social and economic information is the monopoly of traditional elites, who still politically dominate these regions. Adequate agronomic information is available for the more productive zones but non-existent for this region. Moreover, local knowledge retained by the communities is often ignored by the banks and technical advisory services who impose their views.

This training project, situated in a marginalized region with many excluded actors, aimed to reinforce the capacities of local stakeholders by helping them to produce their own knowledge within their own projects. Projects were classified as territorial projects, individual production projects or collective service projects. We will analyze this experience to bring some practical perspective on the following questions:

- What was the role of information in the learning process?

- Was the actors' capacity to mobilize project information strengthened?

### UniCampo: organization of the learning process –

At the beginning of the year 2000, several institutions, including universities in Brazil and CONTAG (the National Agricultural Workers Union), started discussing the project of a Farmer University for Brazil. The objective was to train rural actors to enable them to combine professional integration, sustainable community development and involvement in local public policies (Caniello et al., 2003). The idea was to develop a network of initiatives, federated around common principles. In 2003, CIRAD and the Universidade Federal de Campina Grande (UFCG) implemented a pilot project, "UniCampo", (short for Universidade Camponesa), in the Cariri territory, in partnership with several local organisations.

The Cariri territory was chosen because UFCG already had several contacts with local organisations, with which it was able to establish partnerships to implement UniCampo. This territory comprises 31 municipalities, covers an area of 12.260 km<sup>2</sup> (20% of the Paraíba state), and has a total population over 190,000 (SIT/SDT, 2008). Cariri is located in the semi-arid region of the Northeast (Figure 2) named *Sertão*. It has long been representative of a traditional agricultural land system based on large *fazendas* or plantations. Production was formerly based mainly on extensive cattle breeding and more recently, on cotton. The great land owners (known as *coloneis*) dominated the economic and political arenas and most of the population was employed by them as agricultural workers or as land tenants.

After the cotton crisis in the early 1980s and the failure of intensive irrigation systems, most land owners abandoned cotton. A nonconflictual land reform occurred progressively, opening spaces for family agriculture. However, intensive use of soil and deforestation of the forest cover of the semi-arid region has led to extensive soil erosion and subsequent land degradation. The Cariri is now one of the territories considered to be most threatened by desertifi-

FIGURE 2 – The Cariri territory in the Northeast region of Brazil



cation in Brazil (Bazin et Cardim, 2003). From a social point of view, the public policies implemented during the past fifteen years have aimed at strengthening the action of NGOs, but they often remain unknown to grassroots communities and local farmer associations. Family farmers are encouraged to participate, but are rarely present in the discussion arenas and when they are, seldom voice their concerns (Bazin et Cardim, 2003; Sayago, 2006).

The 30 students of UniCampo were selected among the farming communities based on their motivation to perform work in their communities. Selection was done jointly with the local partners including a technical advisory service, an education forum, and township administrators. As the students all had jobs (and were all part time farmers), courses were held during weekends.

Although the contents of the courses were not completely fixed when UniCampo began to function, the principles were. The main principle, based on Paulo Freire's theories, (Freire, 1974) was to develop problem-based learning, questioning the students' own reality (Caniello et Tonneau, 2006).

Seven key questions guided the process:

- Who are we?
- What resources do we have?
- How do we use these resources?
- How can we use what we have more effectively?
- What project do we want?
- How can we implement the project?
- How can we manage the project?

A second important principle was to develop an equal relationship between students and teachers. This is a process of dialogue, in which the students contribute their practical knowledge, while the teachers contribute formalisation and research tools.

The pilot course, which lasted for three years from 2003 to 2005, was put together progressively in three periods, and adjusted step by step to meet the students' demands. The first period (in 2003) enabled the participants to become aware of the mechanisms of underdevelopment that affect the semi-arid region. The second period (in 2004) was centred on training through research (analysing situations in the Cariri). The third period (in 2005) encouraged individual and collective development projects and adapted technical and practical training to the needs of each project. Projects ranged from individual hen raising, to collective gardening with women or introducing haying to many farmers in the territory.

After this pilot course, plans were made to implement new courses

based on the same principles. To draw the lessons from this first experience, a doctoral research project assessed the learning dynamics and their impact on the students and on the development of the territory (Coudel, 2009). Several projects have been undertaken after UniCampo, with a similar philosophy, both in the Cariri territory and in other territories. However, UniCampo was the most ambitious program, and we will therefore focus our analysis on the learning dynamics and impacts which occurred during this first pilot course.

**Analyzing the learning dynamics** – To assess the learning dynamics after the course, different methods were used: interviews with all the actors involved (students, teachers, partners), group reflections, or the use of tools such as collectively constructed branch diagrams to analyze what factors most influenced the learning (Coudel et al., 2009).

This assessment shows that as a result of the progressive planning of the course, the learning dynamics were adapted to the needs of the students and different types of information were mobilized. During the first period, the students, from different backgrounds and geographic areas learned to understand each other's realities, exchanging information on respective activities and cities. The teachers brought general information, including historical and political information, which generated questions and enabled a discussion on development models (such as the green revolution model). Both these dynamics contributed to define new values within the group, similar to a double-loop learning process. In fact, the students created an association after this first period, consolidating their group identity.

The second period continued this dynamic: the research process enabled the students to search for information on their territory and produce new information,

TABLE 2 – Learning dynamics at UniCampo Farmer University and information mobilized

Period	Learning dynamics	Type of information
PERIOD 1 <i>Involving the actors</i>	Students discover each other and exchange, as well as they learn to discuss with teachers ( <i>double-loop</i> )	<i>Framing information</i> : mapping the territory, field visits
PERIOD 2 <i>Defining a project</i>	Research projects to understand their territory and define how they want to act ( <i>double-loop</i> )	<i>Exploratory information</i> : methods for research, main issues in the territory (social, environmental, educational, cultural)
PERIOD 3 <i>Getting ready to implement the project</i>	Actors must develop the competencies to implement the project, by acquiring knowledge ( <i>single-loop</i> )	<i>Codified and adapted information</i> : Visits to farms to understand techniques, technical writing and statistical analysis, project assessment
AFTER TRAINING <i>Towards new projects</i>	Ex-students discover the other organizations of the territory and must learn to act with them ( <i>triple-loop</i> )	<i>Comparative information</i> : information about other projects, networking on agroecology

adapted to their needs, in order to define their own project, individually or collectively. This information allowed them to explore the possibilities and define what they wished to do. This consolidated the double-loop learning-the project being a way to make their new values come true.

In the third period, the students expressed a need for competencies to develop their projects. They wanted technical information (for example, how to milk goats or how to raise hens), but also methods on how to write up their project results (for example, technical writing and statistical analysis). They initiated a single-loop learning process, to implement their projects. They were able to use information produced during the research process which was adapted to their own context.

After the UniCampo course, the students continued to share amongst themselves and to undertake new development projects in the territory thanks to the association that they had created. During the process they became aware of other organizations in the territory and had to consider how they would interact with them. Eventually, this may lead to triple-loop learning, in which the students would define new frameworks for acting in their territory in relation to other institutions. For this, the ex-students need to develop a capacity for critical analysis of the information they receive on other projects developed in the territory and learn from others' experiences.

When the UniCampo Farmer University capacity building process is analyzed with the learning loop theory (Table 2), it is clear that each period featured specific learning dynamics, similar to a project cycle. The teachers were careful to always encourage the students to not take anything for granted, to look for the information they needed and to produce new information that would be required for their projects. Information and knowledge production was an important part of the learning process, but did it prove to be usable and useful for the actors after the training?

### Importance of the information after the training –

The post-training assessment also included evaluation of the actors' capacity to apply what they had learned during the training to their every day activities (Coudel et al, 2008). Interviews were carried out with the students and the local organizations of the Cariri territory and different interactive methods (cognitive maps, card games, diagrams) were used to assess the different types of learning that had occurred and how this was used by the actors.

The information and knowledge produced was indeed usable-the actors emphasised how much they had used it for their projects. The knowledge was understandable since it had been created and internalized by the actors, themselves, through interactions with the teachers. The seven key questions had an important role in determining this usability; because the actors created new knowledge for their own projects, it was relevant and well adapted to the context. Moreover, the information was usable not only for their personal projects, but also for their communities. Many students tried to pass on their knowledge to others.

The knowledge created has also equipped the actors to engage with other organizations (associations, administrations, unions), and to involve themselves in local and territorial policies. In fact, this knowledge gives the actors a new legitimacy, as it appears to be legitimate knowledge. This legitimacy is both internal and external. Since the actors produced this knowledge, they consider it as valuable and worth defending and promoting for their own projects, for their community projects (for example, convincing their neighbours) or for the territory (for example, in negotiations on local policies). And since UniCampo became quite recognized as a result of the pilot course, the other actors of the territory also considered the knowledge produced there as legitimate. However, the other territorial actors did not always want to recognize the students as legitimate to act more widely with this knowledge and often considered they should have limited themselves to their own projects.

Indeed, this learning process has introduced change. It has fundamentally changed the way actors carry out their projects, introducing a new way of perceiving and creating knowledge and enabling new forms of interaction between actors. For example, ex-students who became technicians can no longer consider themselves as holders of 'universal' knowledge, but discovered that they need to build this knowledge jointly with the farmers based on the farmers' practices.

Ex-students trained to question conventional modes of knowledge transmission have encountered some problems getting involved in development organizations: they are either simply not hired because they are seen as potential disturbers of the established order; or they do not have the opportunity within the organisation to make use of this new methodology, which often leads to frustration. This reveals the limits of individual empowerment and the need to consider another training target: territorial organisations.

The knowledge, created within a cohesive group, was linked to the creation of new values (double loop learning). The students did not always realize this, and often, when trying to discuss new knowledge with neighbours or with other organizations, they were frustrated because others could not understand it, as they did not share the "founding" values. Spreading the information and knowledge outside the initial group and making it understandable by others is still a challenge. This is where understanding better the conditions which enable triple loop learning would be important.

## Discussion and perspective

Sustainable development requires innovation; innovation requires relevant and useful information. Our hypothesis is that information can only be useful and useable if information production is linked to capacity building in a shared learning process.

The learning-loop theory formalizes how information can be best adapted to enhance the learning processes. To avoid utilitarian projects without perspective, reflexion about paradigms and values is necessary. This corresponds to triple loop learning, defining new frames for common action. Double and single loop learning are necessary to define collective group values and competencies that contribute to an effective project. And, to do so, it is necessary to also apply simple information (zero loop).

At UniCampo, information has been an important element of the learning process, promoting change and dialog to empower actors and develop capacities to identify or to produce relevant information. In fact, the learning process was not only an educative process. There was also an objective of change, to use these capacities to build new projects that more effectively contribute to sustainable development. The challenge is to mobilize both capacities and information in projects.

To enable this interaction between information, capacity building and action, the learning process at UniCampo was organized around three projects:

- A territorial project to encourage the actors to define a social consensus towards sustainable development;
- Individual projects to enable practical involvement of every actor in the territorial project, by inventing new forms of production and new activities;
- A collective project to invent new forms of governance and provide services (credit, technical assistance) to translate the territorial project into collective actions and eventually in public policies

UniCampo provides an interesting example of how information production can serve learning dynamics to enable development processes, both among the farmers involved in the project and within the overall Cariri territory. In 2009, an extended campus of the UFCG was built in the town of Sumé, after a strong lobbying campaign by the students, local politicians and the teachers of UniCampo, bringing long term institutional change to the territory. Moreover, the student association, now an NGO, is often mentioned by local organisations and also by governmental institutions, such as the Ministry of Agrarian Development, as a success story of how family farmers can bring their voice to the political arena.

Nevertheless, some limitations of the UniCampo project can be identified. To enhance territorial development, the learning process should better interact with the territorial governance process, so that the students are not isolated from the other actors in the territory. The lack of interaction with the actors in charge of territorial policies has been highlighted in various assessments. The political elite, legitimate because elected, is only marginally interested in an alternative process that could question its dominance. In this context, it has already been quite a challenge for the students to defend their collective vision and their territorial project within the wider territorial forum, in order to share those projects and mobilize resources from existing public sources of support.

The students may have produced usable information at UniCampo, but its usefulness often depends on the context. This recalls Sen's theory on capabilities (Sen, 2003): to act, an actor needs more than capacity, he also need opportunity. Information may seem appropriate, usable, relevant, but it can only be useful if the actors have the capacity to use it and if their environment offers them the opportunity to use it.

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# Developing a Mixed Knowledge Innovative System of Technical, Institutional and Traditional Information for Capacity Building and Empowerment of Multi-stakeholders Networks in Rural Africa

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**ABSTRACT:** The food challenge and sustainable management of natural resources in Africa involve capacity building of all stakeholders in rural areas. The challenge is to enable local development actors to adapt their practices to a global context in crisis both economically and ecologically. This grand challenge will require the development of innovative approaches and the development of tools for new learning and communication that will include new communication technologies and information while remaining respectful of the cultural context. Thus, the innovation needs to be co-constructed from local know-how and scientific and technical knowledge. Information and communication between all those involved in development needs to be revised and strengthened, in order to be more interactive and more efficient. A workshop “Learning, Producing and Sharing Innovations: Tools for Co-Construction and Sustainable Implementation of Innovations in Dryland Africa (APPRI)”, was held in Ouagadougou in 2008 to identify the best co-learning models to support farmer innovation systems. Two models were reviewed. The ‘Farmers’ University’ model was developed in Africa and Brazil and serves as a place to unify partnership initiatives, by bringing together research, rural development officers, farmer organizations, producer groups, and rural communities and municipalities. These Farmers’ Universities are places of learning where a common vision is shared for implementing development and environmental improvement activities, particularly intended for small family farms. Another model, the ‘Innovation caravan against hunger’ developed in Cameroon and which involves the whole chain of stakeholders, notably producers, scientists and policy makers, was found relevant to be a communication method to enhance consultation among various actors and to promote and improve innovation sharing.

**RÉSUMÉ:** Le défi alimentaire et la gestion durable des ressources naturelles en Afrique impliquent un renforcement des capacités de l'ensemble des acteurs du monde rural. L'enjeu est de permettre aux acteurs locaux du développement d'adapter leurs pratiques à un contexte mondialisé et en crise tant sur le plan économique que sur le plan écologique. Ce grand enjeu passera nécessairement par le développement de démarches novatrices et par la mise au point d'outils d'apprentissage et de communication qui feront appel aux nouvelles technologies de communication et d'information en restant respectueuses du contexte culturel. La démarche innovante doit donc être co-construite à partir des savoirs locaux et de la connaissance scientifique et technique. L'information et la communication entre tous les acteurs du développement doivent être repensées et renforcées pour être plus interactives et plus efficaces. L'atelier APPRI, tenu

à Ouagadougou en 2008, permis d'identifier des modèles d'apprentissage adaptés au contexte rural africain. Un promoteur est fourni par le concept d'«université paysanne» développé en Afrique et au Brésil. Les universités paysannes sont comprises comme lieu de fédération d'initiatives en partenariat regroupant la recherche, les agents du développement rural, les organisations paysannes et groupements de producteurs, les communautés et les communes rurales. Ces universités sont des lieux d'apprentissage où se partage une vision commune afin de mettre en œuvre des actions de développement et de valorisation du milieu destinées notamment aux petites exploitations familiales. La «caravane de l'innovation contre la faim» développé au Cameroun est un exemple de la forme que pourraient prendre ces lieux d'échange de savoirs entre les acteurs, notamment producteurs, chercheurs et décideurs politiques. Cet outil a été jugé pertinent en tant que méthode de communication pour améliorer la concertation entre acteurs et le partage d'innovations a été jugé pertinent par les participants de l'atelier APPRI. Le concept est présenté sous la forme d'un dispositif expérimental d'appropriation des stratégies d'information et de communication et de gestion collective intégrée de l'IST et des savoirs locaux.

**RESUMEN:** El reto alimentario y el manejo sostenible de los recursos naturales en África involucran el fortalecimiento de capacidades de todos los interesados directos en zonas rurales. El reto radica en capacitar a los actores de desarrollo locales para que adapten sus prácticas a un contexto global en crisis, tanto económica como ecológicamente. Este gran reto requerirá el desarrollo de enfoques innovadores y de nuevas herramientas de aprendizaje y comunicación que incluyan nuevas tecnologías de información y comunicación, mientras siguen siendo respetuosos del contexto cultural. Por lo tanto, la innovación debe co-construirse a partir de tecnologías y conocimientos científicos y técnicos autóctonos. Deben revisarse y fortalecerse la información y comunicación entre todos los involucrados en el desarrollo para ser más interactiva y más eficiente. Se celebró un taller “Aprendizaje, Producción y Participación de Innovaciones: Herramientas para la Implementación para la Co-Construcción e Implementación Sostenible de las Innovaciones en las Tierras Secas de África (APPRI)”, en Ouagadougou en el 2008 para identificar los mejores modelos de co-aprendizaje para apoyar los sistemas de innovación de los agricultores. Se examinaron dos modelos. El primero, ‘Universidad de Agricultores’, fue desarrollado en África y Brasil, y sirve como un sitio para unificar las iniciativas de coparticipación, al reunir investigadores, oficiales de desarrollo rural, organizaciones de agricultores, grupos de productores y comunidades y municipios en zonas rurales. Estas Universidades de Agricultores son lugares de aprendizaje donde se comparte una visión común para implementar actividades de desarrollo y de mejoramiento ambiental,



orientadas particularmente hacia las pequeñas fincas familiares. El otro modelo, 'Caravana de Innovación contra el Hambre', fue desarrollado en Camerún e incluye toda la cadena de interesados directos, en particular productores, científicos e in-

stancias normativas. Se encontró que este último era pertinente como método de comunicación para mejorar la consulta entre diversos actores y para promover y mejorar la participación de innovaciones.

## Introduction

**In 2008, manifestations of hunger** culminated in poor countries worldwide due to the increased price of cereals and food products in the international market. This grave food security crisis, exacerbated by the environmental crisis, has put agriculture and rural development in first place on international agendas for development cooperation, especially in Africa which is the continent the most affected by food insecurity (FAO-GIEWS, 2009).

**What is the issue addressed?** – Malfunctioning food market prices, combined with high human pressure on natural resources aggravated by climate change, has hampered the capacity of agriculture to feed future generations of Africans. The previous model for agriculture development was based on intensification of production and linear standardized technology transfer disregarding environmental protection—a so called “top-down approach”. This model is presently discredited due to its inability to combat hunger and preserve the natural resource base. An innovative global partnership approach is required to improve the social and human wellbeing impact of rural innovations for more sustainable economic development (Figure 1).

**How to support sustainable rural innovation in smallholder agriculture in Africa?** –

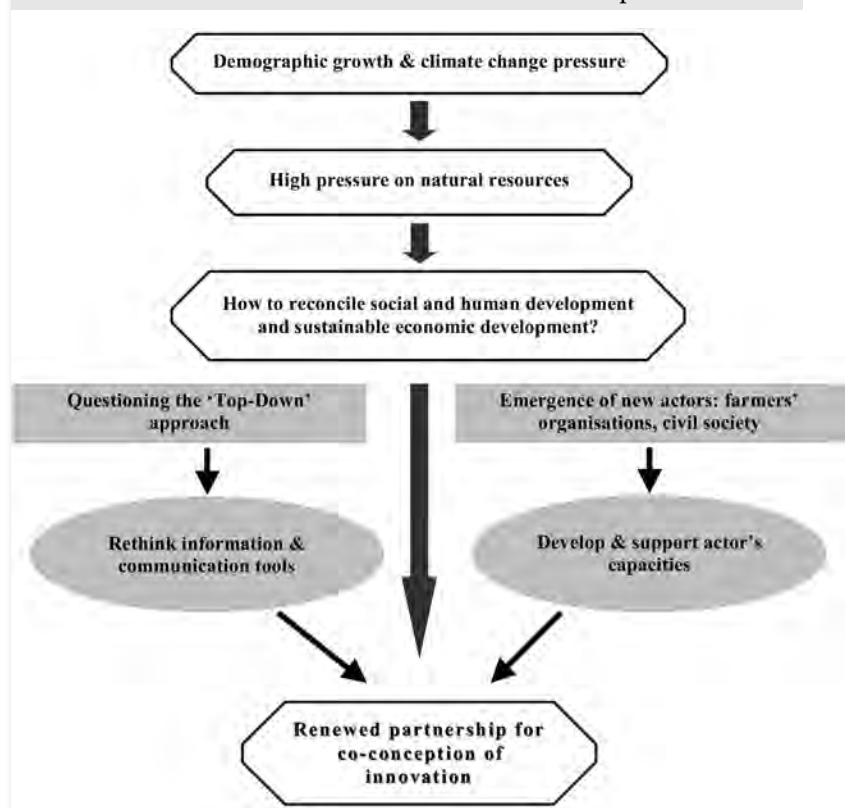
It is now widely recognized that sustainable rural development requires a shared understanding of the social, cultural and technical context in which innovation can (or could) raise crops production and incomes. The first International Assessment of Agricultural Knowledge, Science and Technology, held in 2008, concluded that “a powerful tool for meeting development and sustainability goals resides in empowering farmers and stakeholders to manage soils, water, biological resources, pests, diseases etc., in an innovative way, and conserve natural resources in a culturally appropriate manner” (IAASTD, 2008).

However action on the ground so far is not sufficient because this shifting of the development paradigm must integrate various factors and actors to properly address the human social and economic development while respecting the environment. In Africa, most countries have implemented administrative

reforms such as decentralisation, and many regional organisations contribute to promote dialogue among stakeholders, notably in the sphere of agricultural research. However, much remains to be done for deeper coordination and information sharing, in particular in the policy and knowledge management level. This re-thinking is coupled with the call for new support materials and new tools to achieve multi-scale appraisal and interventions. The challenge is to implement information, communication and dissemination mechanisms and tools suited to the profiles of the different stakeholders involved in an innovation process from researchers to farmers and policy-makers. This challenge will create an opportunity to mix traditional knowledge and new knowledge for improving relevancy of Information and Communications Technology (ICT) support to rural people in Africa.

**Renewed information and communication tools and channels for supporting actors' capacities on the ground are key elements for improving sustainability and scaling the potential of the innovations.** – A pioneering model is presented that aims at production of shared know-how by collective integrated management of Scientific and Technical Information (STI) and local knowledge. It is illustrated by two exemplary initiatives, Weendou Bosseabe (Senegal) and Citizen Caravan (Cameroon) presented

FIGURE 1 – Rationale behind the sustainable rural development in Africa





during the APPRI Workshop 'Learning, Producing and Sharing Innovations (APPRI): Tools for co-construction and sustainable implementation of innovations in Dryland Africa', Ouagadougou, 21–24 October 2008 (Clavel, 2008). These studies and analyses nourished the proposal presented in this paper, of an innovative design for collective management of information and local knowledge intended to improve the impact of innovations on rural development.

### A model for collective integrated management of Scientific and Technical Information (STI) and local knowledge

The study was conducted in Senegal and began with the observation of a gradual decline of the role of specialists in documentary information during the last three decades. The starting point was the recognition of the absence of farmers in the typology of users of information services and of the absence of scientific and technical information (STI) specialists in dissemination of results of agricultural research. This research has been the subject of a doctoral thesis (Kane Touré, 2005) and publications (Kane Touré, 2002).

The model described was based on the results of this research and led to the implementation of a university research program (Figure 2). The Weendou Bosseabe example described below was an important phase of this experimental implementation to liaise between research, knowledge, and local innovation.

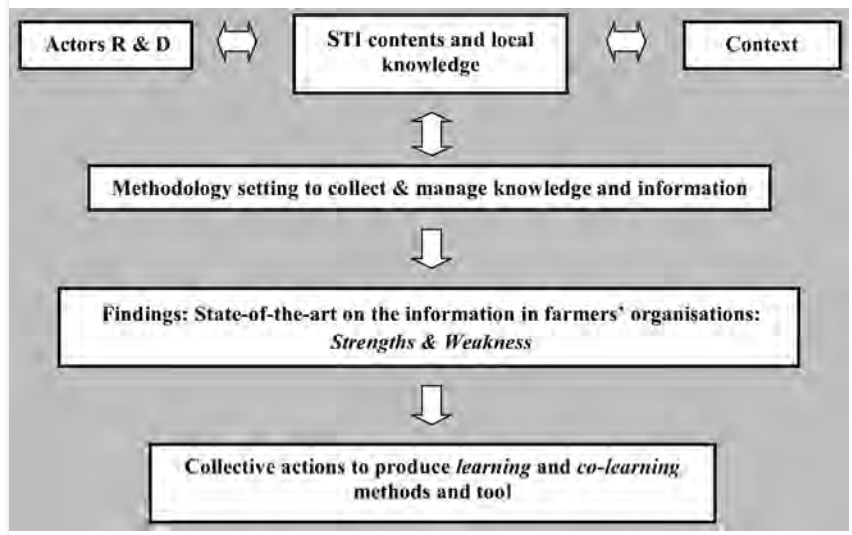
**Context** – The agriculture sector constitutes 67% to 70% of the population in Senegal and West and Central African countries. This sector has been gravely affected by structural as well as temporary difficulties (climatic, social, cultural, economical, political, and technical). Globalisation and international economic crises have worsened the situation.

**Objectives** – The study aimed to investigate conditions to improve communication, access and use of STI and local knowledge, in a participative method with farmers and others actors.

**Description of the Model** –The target area of the study covers, at the local level, eight of the fourteen regions in Senegal. The components of the system, described in Figure 2, are:

- **Contents:** Which STI?: the potential of STI generated by agricultural research produced in a formal context (written, iconographic, audiovisual, and numerical). Which knowledge?: the potential of local agricultural knowledge produced by farmers (technique of capturing and valuing farmers' know-how);

FIGURE 2 – Model for the collective integrated management of STI and local knowledge by the rural people in Africa (Kane Touré, 2002)



- **Research and Development (R & D) Actors:** Actors from public and private sectors: farmers' organisations; information and communication professionals; researchers; scientific and commercial editors; educators and training agents; political and institutional decision makers ; NGOs; and donors;

- **Methodology:** quality, quantity and systemic methods which combine several techniques: identify farmers' information and communication practices; investigation on site (e.g., area methods, group and individual interviews); data collection techniques (e.g., discussion groups, quick diagnostic in rural environment);

- **Findings:** state-of-the-art findings with strengths and weakness on information in farmers' organisations including: no knowledge of the potential of information and communication professionals; producers have needs for professional information; existence of traditional networks and systems of information and communication; strategies for agricultural information appropriated and popularized by farmers, but the important documentary information is not adapted to their needs, profiles, cultural and economic environment; real language barriers; deficit of rural infrastructures; emergence of new technologies; interdependence of agricultural research, STI, local knowledge, networks; innovations and related sectors (formal and non-formal education and training; literacy and capacity for scientific writing);

- **Actions:** it is essential to: increase the value of a fund of knowledge (STI and local knowledge) including all the involved actors; the curricula (news activities, projects, services and products) needs to be re-considered taking into account the need to train a new kind of information specialist-a manager of knowledge, a scientific populariser and mediator; participate in capacity

strengthening of all actors; appropriation of information, local knowledge, traditional knowledge (e.g., rural radio, audio and multimedia libraries, using a bus, a train, a cart, a bicycle or motorcycle vehicles), new technologies (open source and access) and official STI publications translated in national languages (and vice versa for local knowledge) and adapted to the needs of the rural partners, users and communities; develop exchanges and experiences among information/communication specialists and stakeholders.

The study concluded that African specialists and searchers of STI knowledge and communication for sustainable development must act in order to obtain a position within multi-stakeholder networks working with producers. However the appropriate response to the above-mentioned problems must involve the engagement of multiple actors at all levels, but particularly the political authorities. Challenges of sustainable economic development will only be resolved with supportive agricultural information and communication policies at the local, national, regional and international levels, that are developed in partnership with all the different actors involved on the ground.

## Example 1

**Weendou Bosséabé: a traditional and modern local experimental food security project for sustainable human development (Kane and Dia, 2008)**

**Context** – This experiment was launched by Harouna Moussa Dia, economic operator and initiator of the project. Harouna Dia is an agronomist from the Senegalese diaspora in Burkina Faso native of the village of Weendou Bosséabé (Rural community of Orkadiéré, Matam Region, Senegal). This community experimental project began in 2005 and involved emigrant and local villagers. The main reasons for the design and implementation of the project lie, firstly, in an earlier experiment set up by the 'Société nationale d'Aménagement et d'Exploitation des terres du Delta du Fleuve Sénégal' (SAED), which was not completed. Secondly, the degradation of livelihoods linked to the desertification typical of this zone and the gradual impoverishment of the inhabitants of Weendou Bosséabé, resulted in villagers' dialogue about their problems and led to a common will to address them.

**Objectives** – The objectives of the project are food self-sufficiency, the increase and diversification of agricultural production, and alleviation of local poverty.

**Description of the project** – The beneficiaries and partners are the inhabitants of Weendou Bosséabé who are comprised of the women's group of 1,050 producers (including housewives who have become producers) and the group of 500 male producers. The methodology used consists of a framework of traditional consultation, based on a participatory approach and actual knowledge of the socio-cultural, physical, economic and political contexts. The villagers practiced community governance

FIGURE 3 – The women's field in Weendou Bosséabé village, Senegal (Photo: K. Kane Touré)



that succeeded in overcoming certain major difficulties, such as the problem of castes and the role of women in the traditional rural environment. They organized themselves by affinities, i.e., according to their own choice (close relatives, friends or neighbors), by sex, and into economic interest groups whose leaders were democratically elected.

The main operations implemented are as follow:

- organization of the land and fencing of the two fields (that of the men and that of the women);
- installation of two tube wells for the two fields;
- the choice of maize crop for the men and market garden crops for the women;
- spray irrigation;
- out-of-season cropping alongside the rainfed crop;
- the mostly biological protection of the crops, but also chemical;
- testing of local and modern technologies; and
- marketing.

The financial and material means used are primarily the financial contributions of the villagers, divided into three categories: 1) villager funding amounting to 2 million CFA F (US\$3,800) for the women and 10 million CFA F (US\$19,300) for the men; 2) funding by emigrants native to the village amounting to 7.5 million CFA F (US\$145,000); and 3) gradual funding by the initiator of the project amounting to a 150 million CFA F (US\$290,000). The human resources are provided by the villagers. The project is currently being funded by the income it generates.

**Results and Impacts** – The main results are linked to the substantial increase of production obtained, which by far exceed their expectations. The men's field produces three cereal or leguminous crops per year, whereas the women's field produces the market garden crops (Figure 3), which are mostly sold to nearby localities by women.

FIGURE 4 – Stakeholder's meeting at COSADER, Yaoundé, Cameroun (Photo: C. Andela)



Worth highlighting is the empowerment of the Weendou Bosséabé women, who manage their plots and their group as they see fit, whilst benefiting from the support of the project. In addition, the endogenous system of governance (based on the community regulations) and organization (autonomy of women and men groups) allows flexibility that facilitates project management.

The main difficulties encountered by the producers are principally technical, related to trench digging, pipe installation, cutting and threading galvanized tubes, sizing the blocks of plots, tilling, and the functioning of field work (electricity load shedding, diesel oil supply shortages, etc.).

The project had local impact but also scaled out repercussions. The villagers-both actors and beneficiaries at the same time-experienced the following impacts:

- access to water;
- the possibility for each person to carry out agricultural activities;
- better working and living conditions;
- food self-sufficiency;
- the health of the populations, particularly that of women and children;
- revitalization of the village with the hope of income; and
- a reduction in the rural exodus.

In addition, the project which is known and appreciated locally, is gaining attention on a regional and national scale by the channel of media, such as "Radio RFM" the Senegalese press agency, "All Africa", etc. The merits of this project lie in the fact that it has been entirely designed and implemented by the inhabitants of the village-men and women producers, without aid from the State or any NGO. The producers have become the true players in their own development, which is intended to be sustainable with true satisfaction of their needs, respect for their traditions and dignity, and the use of modern techniques (tube wells, spray irrigation).

**Prospects** – Those involved in the project are satisfied with the positive results achieved. However, they are aware that there is still some way to go. Thus, their prospects are first of all geared towards a formal appraisal, for greater consolidation of the achievements, that will lead to project sustainability in human, physical, technical and financial terms. They then aim to strengthen their skills through appropriate learning. They wish to formalize, capitalize and make optimal use of their knowledge and know-how, to enable exchanges with each other and with other producers initiating rural projects. They are aware that, although the income from the project is currently helping it to function, its perpetuation calls for the scientific, technical and financial support of agricultural and rural development specialists and of funding agencies. Assessment of the project would enable its generalization. Indeed, with the support of village experimenters and sustainable development partners, many localities in Senegal and other countries of West Africa could also live this original and enriching experience of Weendou Bosséabé.

## Example 2

### *The citizens' anti-hunger caravan: an experience of Pouma rural communities in adapting to climate change (Andela, 2008)*

**Context** – The national alliance against hunger in Cameroon is a multi-stakeholder group that resulted from an appeal launched by the FAO in 2003 to build an International Alliance against hunger, and which was the topic of the World Food Day that year. The national alliance against hunger, with the support of the Collective of NGOs for Food Security and Rural Development (COSADER) has developed the "Citizens' anti-hunger Caravan" (CC) as a strategy for social mobilization against hunger and poverty.

**Objectives** – COSADER (<http://www.cosader.org>) is an association that was founded in 1996 to bring together NGOs and associations working for food security and rural development in Cameroon, in order to:

- Coordinate their efforts to make them visible;
- Ensure constant lobbying of politicians and donors in favour of rural development (Figure 4);
- Support rural and urban organizations in their work to fight hunger and poverty.

The CC is the strategy adopted by COSADER to unify the initiatives of different stakeholders through exchanges of experience and information. The founding members are the CSOs, traditional authorities, religious authorities and rural organizations which were joined by the Chamber of Agriculture, decentralized local government, micro-credit establishments and insurance companies.

**Project description** – The town of Pouma, in the forest zone, was the launch-pad for the CC in 2008. The situation in Pouma is interesting for observing the consequences

of climate change-particular, the effect of increased irregularities of rainfall. The CC went to the towns of Bafoussam (West Province Capital) and Sangmelima (South Cameroon forest zone) where Local Committees (LC) for food security and poverty alleviation were set up. The LCs play a key role in the system. Specifications for the LCs were drawn up with COSADER. These include: identification of active rural groups, exchanges on projects and identification of the difficulties encountered, the strategies adopted locally to solve those problems, dialogue with local traditional, communal and administrative authorities on local development and consideration of the needs and proposals of the groups in community development plans.

**Results and impacts** – A dialogue of rural women was organized by MINADER/ Chamber of Agriculture / FAO and facilitated by COSADER/National Alliance, on 15 October 2008 at the Chamber of Agriculture. This meeting was attended by 102 rural women from 10 provinces in Cameroon. COSADER monitored 5 rural groups identified by the LCs in terms of their strategies for adapting to climate change. The survey covered agricultural practices and the households. The monitored farmers had highly appropriate perceptions of adapting to climate change, such as:

- Replacing dried seeds of root and tuber crops in the same plot with groundnut seeds (long-cycle tuber crops replaced by shorter-cycle groundnut);
- Use of the MINADER local service (advice covered seed selection, sowing techniques, phytosanitary control)
- Diversification of farm activities (especially processing, small-scale trade, small-scale fishing, beekeeping, fish farming).

As regards households, the surveys conducted among farmers revealed that water had decreased in the tube wells. The direct consequence of that reduction in water is a return to non-managed sources in the valleys for domestic water supplies.

**Prospects** – COSADER acts as permanent secretary for the “Cotonou Thursdays” (places for dialogue and exchanges created at the initiative of civil society organizations), is leader of the “independent monitoring” commission for citizen dynamics and serves as sub-regional coordination for the Coalition of African Organizations for Food Security and Rural Development (COASAD) and a focal point for the sub-regional project to strengthen the capacity of civil society organizations in the prevention and management of conflicts (PREGESCO). To fulfil those tasks, the institutional strengthening of COSADER is necessary, notably to ensure the perpetuation of staff and the acquisition of modern communication equipment.

New stakeholders are becoming involved in the National Alliance against Hunger and 20 groups per province, i.e. 200 groups for the launch phase were given

access to funding. New planning is scheduled for 2009, and an efficient communication plan is to be drafted with all interested parties, with recourse to outside appraisal and auditing.

## Designing collective management of information and local knowledge for capacity building

A general framework based on existing practices and background experiences of the participants was proposed during the multi stakeholders' APPRI Workshop (CIRAD, Burkina Faso website info, 2008; Clavel, 2008). The analysis of the initiatives presented pointed out that to transform a technological innovation into human progress it is necessary to have global approaches and contextualized participatory methods and tools based on education and sharing knowledge. Existing practices and tools presented led to the following general observations:

- A multiplicity of more or less participatory learning practices
- Highly contextualized practices i.e. specific to a particular environment
- A subsequent need for global and flexible approaches for education and capacity building
- High requirement for methods allowing sustainability, perpetuation and scaling up to reach politics
- Research needs for implementation of information, communication and dissemination mechanisms suited to the profiles of the different stakeholders of the innovation value chain
- Gap for training methods and tools adapted to stakeholders profiles: extension officers, local NGOs, academic educators, decision-makers and policymakers.

To reach the objective of building competencies for sustainable development, consensual key ideas and basic concepts and tools emerged from discussions during the workshop, they are:

**Key idea 1** – Tackle innovation in the broad sense as defined by UN/UNDP from reports on human development: right to health, access to knowledge and access to the resources required to achieve a decent standard of living and be in a position to take part in community life. Innovation therefore has a social, cultural and political role. Hence, there is a need to define fundamental principles to lay down a charter for traducing a common vision of the future of the whole society or territory addressed.

**Key idea 2** – Increase the stakeholders' education and competencies enabling the formulation of true needs by stakeholders and civil/political expression. Such an increase in capacities involves:

- Improving access to knowledge: create appropriate forums, develop knowledge media and appropriate contents



- Improving communication between stakeholders and between civil society (media, groups) and stakeholders
- Supporting action that brings skills into play
- Creating links/relations: importance of mobility and local facilities
- Implementing initiatives co-constructed at all levels of intervention
- Taking into account the perpetuation and sustainability of innovations/interventions

**Concept-tool 1** – The Farmer University is seen as a social innovation, a focal point for knowledge bringing together research, rural development staff, farmer organizations and producer groups, rural communities and local authorities. The model described is that of the UNICAMPO-association-Farmer University, Nordeste, Brazil (Sécheresse-AUF website, 2009; see also Dr Coudel presentation at this meeting)

**Concept-tool 2** – The Citizens' Caravan for innovation, a travelling forum, is a strategy for mobilizing all stakeholders, from public authorities to scientific research, for which a central objective is to improve the access of populations to information, particularly about communal development policies. This information, passed on from village to village, enables collective mobilization of communities as a force for proposals in the defence of their interests. The model is that of the "Citizens' anti-hunger caravan" launched by the COSADER NGO group in Cameroon (Andela, 2008).

## Recent trends to strengthen the Information and Communication Technologies (ICTs)' role for rural development in Africa

At the present time the pioneer model developed in Senegal and APPRI Workshop results are substantiated by very recent international seminars and projects examining from a forward looking perspective, the research needs to increase the impact of rural innovations in Africa. Among these meetings, we can cite the 'CTA Annual Seminars' 2008 on climate change and 2009 on the role of media, the 'Sciences Forum 2009' jointly organized by the Consultative Group for Agricultural Research (CGIAR) and the Global Forum on Agricultural Research (GFAR).. The Science Forum 2009 focused on promising research that needs greater investment and essential partnerships to deliver impact and hosted a specific session 'ICTs transforming agricultural science, research and technology generation' (Clavel et al., 2009).

The EU funded Project 'Platform of African-European Partnership in Agricultural Research for Development (PAEPARD) phase 2 (FARA 2010) designed for promoting partnerships of Agricultural Research for Development (ARD) stakeholders from Europe and Africa, identified that one of the main challenges for greater impact of rural innovation is to bring on board all research and non-research stakeholders and the main

instrument to do that is renewed capacity building for all actors.

These initiatives identified important knowledge gaps and little consideration of Information and Communication Technologies (ICTs) for capacity building. They concurred on the importance of building new capacities, competencies and skills of all actors involved in rural development by using innovative and appropriate tools, methods and platforms.

## Conclusion

The enhanced ability of the rural African people to conceive collectively innovations and act on these innovations is paramount in order for them to have control of their own destiny. The conditions for a green revolution in Africa are under analysis and raise several issues (Faye, 2008) but in any case there is no green revolution without a grey revolution (Sène, 1992). Therefore, today, the development and implementation of information, communication and dissemination strategies adapted to the needs of the different groups of actors has become a central objective largely shared by institutions involved in rural development.

However, to create conducive conditions for enhancing the capacity of stakeholders for continuous adaptation and collective innovation requires a rethink of the multidisciplinary and multi-stakeholder action research approach. The best ways and means to use for putting into practice the findings for improving food security, improved livelihoods and policy making, while giving due recognition to the local contexts and indigenous knowledge systems for sustainable management of their environment resources, is still under debate and still being tested.

It is now widely recognized that there is a need for renewed multi-stakeholder partnerships, co-learning tools, participatory mechanisms and channels so that the innovative education strategies can be scaled out and up and synergised beyond the context where they were conceived. But this paradigm shift entails generating innovative methods for capacity building, i.e., defining and testing collectively new approaches for improved dialogue, information, communication, sharing knowledge and co-learning methods at different levels of intervention from producers to policy makers.

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# Targeted Information Products and Services: Balancing Stakeholder Needs, Learning, and Strategy

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**ABSTRACT:** CTA's core mission is to improve the information and communication management (ICM) capabilities of agricultural and rural development organisations in 79 African, Caribbean and Pacific (ACP) countries. In this article, we draw on CTA's experience with providing a broad range of targeted agricultural information products and services for the past 25 years to identify four guiding principles for designing and providing agricultural information products and services that meet the specific information needs of the intended users or user groups. One principle stands out: "always put the stakeholders (i.e. intended user or user groups) before the product or service". The other three principles relate to different aspects of the interrelationship between the intended users and service providers, with the products or services themselves being of secondary importance. We suggest that information professionals and their respective organisations need to change their practices fundamentally, in particular, by being more strategic and rising to the challenge of becoming leaders in the development community. To be able to consistently adhere to these principles and take on these new roles, information professionals should first acquire the skills that will allow them to participate actively in planning, monitoring and evaluation (PM&E) on a regular basis.

**RESUMÉ:** La mission principale du CTA est d'améliorer les capacités à la gestion de l'information et de la communication des organismes de développement agricole et rural dans les 79 pays d'Afrique des Caraïbes et du Pacifique (ACP). Dans cet article, nous tirons parti de l'expérience du CTA dans la fourniture d'une large gamme de produits et services d'information agricoles ciblés pendant les 25 dernières années pour identifier quatre principes directeurs pour concevoir et fournir des produits et services d'information agricoles qui répondent aux besoins d'information spécifiques des utilisateurs ou des groupes d'utilisateurs ciblés. Un principe de base ressort : « toujours considérer les parties prenantes (c.-à-d. les utilisateurs ou les groupes d'utilisateurs ciblés) avant le produit ou le service ». Les trois autres

principes concernent différents aspects de la corrélation entre les utilisateurs visés et les prestataires de service, les produits et services eux-mêmes étant de moindre importance. Nous proposons que les professionnels de l'information et leurs organismes respectifs changent fondamentalement leurs pratiques, en particulier, en étant plus stratégiques et en relevant le défi de devenir leaders dans la communauté pour le développement. Pour pouvoir adhérer de façon cohérente à ces principes et jouer ces nouveaux rôles, les professionnels de l'information devront d'abord acquérir les qualifications qui leur permettront de participer activement et de façon régulière à la planification, à la surveillance et à l'évaluation.

**RESUMEN:** La misión fundamental del CTA es mejorar las capacidades de gestión de la información y comunicación de las organizaciones de desarrollo agrícola y rural en 79 países de África, el Caribe y el Pacífico (ACP). En este artículo, se hace uso de la experiencia del CTA en ofrecer una amplia gama de productos y servicios de información agrícola dirigidos a audiencias específicas durante los últimos 25 años para identificar cuatro principios orientadores para el diseño y suministro de productos y servicios de información agrícola que satisfagan las necesidades específicas de información de los usuarios o grupos de usuarios propuestos. De estos, se destaca un principio: "siempre poner a los interesados directos (es decir, el usuario o grupos de usuarios propuestos) antes del producto o del servicio". Los otros tres principios se relacionan con diferentes aspectos de la interrelación entre los usuarios propuestos y los proveedores de servicios, con los propios productos o servicios siendo de importancia secundaria. Sugerimos que los profesionales de información y sus respectivas organizaciones deben cambiar sus prácticas de manera fundamental, en particular, siendo más estratégicos y haciendo frente al desafío de convertirse en líderes en la comunidad de desarrollo. Para poder adherirse sistemáticamente a estos principios y adoptar estas nuevas funciones, los profesionales de información primero deben adquirir las habilidades que les permitirán participar activamente en actividades de planificación, seguimiento y evaluación, en forma regular.

## Introduction

The term "targeted services" is commonly used in the health and education sectors to denote services that are made available to selected individuals or groups with special needs. This is in contrast with "universal services" which are available to the whole population. Commercial firms also tend to employ this term, essentially to describe "tailor-made" services, i.e. designed to meet a specific need expressed by a given client with the requisite purchasing power.

The decision to provide and maintain "targeted infor-

mation products and services" in the private sector can be based entirely on sales levels and the profitability of the business. In the development community, on the other hand, where information products and services are either free of charge or heavily subsidized, decisions to invest in "universal" or "targeted services" tend to be based on multiple (non-monetary) criteria. Typical questions facing service providers (investors) in the not-for-profit sector include: Is the product or service relevant? Is the information useful? Is it making a positive difference to a significant number of users or to society

at large? How can its usefulness be maintained or increased? Do people really care whether or not the product or service is maintained or stopped? Obtaining objectively verifiable answers to these questions is far more complicated than measuring sales and profit levels. This article argues the case for sound and systematic planning, monitoring and evaluation (PM&E) practices for developing and maintaining “targeted agricultural information services”. It also explains why information professionals should acquire the skills that would allow them to be actively involved in PM&E on a regular basis, and consequently grow into leaders in the development community.

The next section contains a brief introduction of CTA with an insight into why the Centre’s intended beneficiaries require “targeted information products and services”. It is followed by a rapid overview of four principles that guide CTA in developing user-focused agricultural information products and services. The penultimate section outlines the implications of these principles for information service providers.

## CTA’s role and the external environment

The Technical Centre for Agricultural and Rural Cooperation (CTA) is an ACP-EU institution working in the field of information for development. Established in 1984, with its headquarters in Wageningen, The Netherlands, CTA’s work focuses on three key areas:

- providing information products and services (e.g., publications, question and answer services and database services)
- promoting the integrated use of communication channels, old and new, to improve the flow of information (e.g., e-communities, web portals, seminars and study visits);
- building ACP capacity in information and communication management (ICM) and knowledge management (KM) mainly through support for the formulation of strategies, skills development and partnerships with ACP bodies.

CTA is mandated to assist 79 African, Caribbean and Pacific (ACP) countries in a collaborative framework, known as the Cotonou Agreement between these countries and the 25 EU states. Well over 500 million people, who constitute CTA’s ultimate beneficiaries, live in rural areas that are characterized by inappropriate and/or inadequate infrastructure (roads, water, electricity, information and communication technologies (ICTs), markets, schools, hospitals, etc.).

CTA’s direct beneficiaries are ACP organisations at local, national and regional levels, including civil society organisations, information service providers, research and training institutions, and government ministries. CTA’s core mission is to improve the information and communication management (ICM) capabilities of these organisations. Given that, in general, public and private investment in agriculture and support services, including

information, is extremely low in ACP countries, CTA’s beneficiary organisations have weak ICM and ICT capacities. The major challenges concerning the ICM/ICT situation in ACP organisations, include poor access to agricultural information and knowledge (scientific and research findings, indigenous knowledge, etc.), limited awareness of existing local and external sources of information, and limited contact with experts in other countries and regions.

The large geographical spread of CTA interventions, the broad diversity of its stakeholders and the resource limitations faced by the vast majority of ACP countries, explain why CTA’s intended beneficiaries require “targeted information products and services”.

## Guidelines for developing user-focused information products and services

CTA’s approach is based on the following principles:

**1st principle:** *Always put the stakeholders (i.e. intended user or user groups) before the product or service* – Known in marketing jargon as “customer orientation”, this overriding principle is easier said than done. It is very common for organisations providing free or heavily subsidised products or services in resource scarce environments to become production oriented, since users may be prepared to accept whatever is available. On the other hand, attempting to adhere to this principle might require a complete change in an organisation’s culture, goals and operations.

CTA’s outreach strategy which seeks to reduce the complexity of its products and services and make them available to a significantly larger number of direct and indirect beneficiaries is driven by this principle.

**2nd principle:** *Understand the priority needs of the intended users or user groups and ensure the products and services are designed to meet their needs* – CTA systematically carries out country-level needs assessment studies, followed by priority-setting exercises. Over 60 such studies have been done since 2004. In embarking on country-level assessments, CTA was aware of some potential shortcomings of the approach, such as the high costs of implementing such an ambitious study and the possibility that consultants would identify a ‘shopping list’ of demands and expectations outside the purview of CTA’s framework for intervention. To address this, an extensive consultation with CTA managers and project coordinators produced terms of reference for the studies to ensure that they serve CTA departments and operations as efficiently and as cost-effectively as possible. A ‘rapid-appraisal’ methodology was adopted involving working with local consultants and local organisations to derive strategic options and priorities. CTA project coordinators are implicated in the results of the entire exercise.

**3rd principle:** *Learn from other actors/ operators who are providing a similar service, and keep investment in new ventures at a low level initially by starting on a pilot/experimental basis* – Recently, CTA has used this principle



in developing its project on supporting Telecentres, by: (i) carrying out case studies in Africa, (ii) organising a study visit in India, and (iii) deciding to only support existing initiatives. CTA is supporting collaboration amongst telecentres, capacity building and the provision of publications and other resources to develop local content for telecentres in the ACP countries. Drawing on the Indian experience, CTA and its partners are also promoting entrepreneurship in the running of telecentres in Africa.

**4th principle: Keep track of those receiving the product or service, and obtain regular feedback from them, and continue to improve and adapt the service using lessons learnt** – CTA carries out systematic evaluations and since 2008 has embarked on a series of “Information outreach and impact reviews” (INFOIR) in 13 countries, with two more missions planned for 2010. CTA products and services that have been adapted because of these recent evaluations include:

- **Spore:** a bi-monthly newsletter that is published in English, French and Portuguese, that will undergo a complete face-lift from June this year (increased coverage and size, increased editorial involvement of journalists and other contributors from ACP regions, and an improved distribution system).
- **Practical Guide series:** following the very high interest shown by farmers and extension agents, during the INFOIR missions, in these thematic how-to-do guides, CTA started supporting translations into widely spoken local languages like Swahili. The choice of topics has also been influenced by the requests reported from the missions.
- **Question and Answer service:** CTA decided to redirect its support for this very popular service towards projects that make use of multiple dissemination channels including radio and mobile phones in order to cater for the needs of people in geographically diverse locations.
- **Book donation scheme:** CTA launched a new book donation programme to respond specifically to urgent and critical needs identified during the INFOIR missions, by replenishing libraries with a large set of documentary resources. New measures are also being taken regarding: (i) the development of a new information system to manage subscriptions and orders, with the possibility for subscribers to interact online; (ii) the adoption of a new principle that rewards the most active subscribers; (iii) a day-to-day management of the stock reconstitution. This new scheme also applies to the distribution of non-CTA reference publications. For example, the French-speaking subscribers now have access to the full catalogue of reference publications in English.

## Implications of these principles for information service providers

Since practically all the organisations supporting development (at international, regional, national and local

levels) are involved in information and knowledge production and sharing, the four principles drawn from CTA's experience are relevant to the development community as a whole, and information service providers in particular. Organisations and information professionals no doubt follow these principles to varying degrees. The main challenge lies in being able to apply them on a regular and consistent basis.

Below we prescribe two forms of solutions for organisations and information professionals that find it extremely difficult to apply these principles: organisational learning and the self empowerment of information professionals.

**Organisational learning** – A report from an Organisation for Economic Cooperation and Development (OECD) workshop has described learning as the ‘new frontier’, the direction in which development organisations need to be heading if they are to develop the capacity to respond to the changing needs of their stakeholders. And this capacity to change, this adaptability, should be fed by learning.

Peter Senge, in his seminal work on organisational learning, puts it this way:

Learning organisations are organisations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together.

Despite the advantages described above, there are a number of obstacles to organisational learning, such as: (i) resistance to change, (ii) insufficient skills for introducing and managing change, (iii) weak leadership, and (iv) absence of appropriate methodological tools for staff development. Organisations therefore need to invest in their adaptive capacity, i.e. the ability to learn and change in response to changing circumstances. This should not be confused with an organisation's operational capacity, which is its ability to carry out its day-to-day activities.

**Self empowerment of information professionals through information and knowledge of their stakeholders** – Written in 2003 in the *Health Information and Libraries Journal*, by a team at Sheffield University, UK, this statement hints at the prospect of information specialists turning into “change managers”.

Information professionals have evolved from simply acting as evidence locators and resource providers to being quality literature filterers, critical appraisers, educators, disseminators, and even change managers.

Information specialists should go much further, by playing a key role in overcoming the obstacles to organisational learning, through:

- acquiring the skills that would allow them to be actively involved in planning, monitoring and evaluation, and subsequently grow into leaders in their respective organisations.

- combining information and knowledge about their stakeholders with their technical skills to emerge as managers and strategists.

Both of these actions would result in the self empowerment of information professionals. This is particularly important for information professionals whose role is marginalised in organisations that do not specialise in the provision of information products and services. Whereas in the case of organisations, such as CTA, that specialise in information and communication management, information professionals are empowered as the organisation continues to nurture and embrace a learning culture.

Examples of resources that can help information professionals become more skillful in planning, monitoring and evaluation include:

- Smart Toolkit for Evaluating Information Projects, Products and Services – a step-by-step guide to support self evaluation exercises (published by CTA/KIT/IICD)
- CTA Executive training in formulation of ICM strategies and policies (currently only available through face-to-face workshops organised by CTA)
- IMARK module on Investing in information for development (an IT-based distance learning tool produced by FAO, CTA and partners).

## Conclusions

Whatever the sector or area of business, the per capita cost of “targeted services” would be expected to be higher than “universal services” because of the additional inputs required such as staff time and possibly more demanding technical and managerial skills. Investing in targeted information products and services therefore requires adherence to certain principles that focus on users or user groups and information professionals, with the products or services themselves being of secondary importance. Above all, organisations need to acquire a learning culture and information professional should empower themselves through the strategic use of information and knowledge of their stakeholder—a case of charity beginning at home! Information specialists should

start by taking note of the increasing number of tools that are now available and adapted to their needs for acquiring skills in planning, monitoring and evaluation, and related topics.

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# Is There a Future for the Traditional Abstracting and Indexing Services?

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**EDITOR'S NOTE:** Paper presented at the IAALD XIIIth World Congress, Scientific and Technical Information and Rural Development, Montpellier, 26–29 April 2010.

**ABSTRACT:** Given the wide variety of databases (Google Scholar, AGRICOLA, AGRIS, PubMed) now freely available on the Web, as well as the bibliographic information from ScienceDirect, JSTOR and other FirstSearch databases included in the freely available WorldCat.org, and given the general user's perception that most information is freely available on the Internet, this paper attempts to answer the question whether indexing and abstracting databases by subscription are still relevant in the academic setting. In so doing, it identifies the purpose of the indexing and abstracting services, discusses the present landscape, and profiles users in terms of their searching habits and their perceptions of the strengths of Google and other search engines. This paper presents findings from a study done at the University of Arkansas, Fayetteville, identifying undergraduate and graduate biology students' preferences for information sources both before and after instruction. This result is compared with those from a course on Fundamentals in Chemistry course to show patterns. By using the CABDirect database and the Web of Knowledge as examples, this study identifies ways in which database vendors have been responding to the "googlization" challenge and highlights the necessary enhancements that may be essential for the survival of abstracting and indexing databases in the future.

**RESUMÉ:** Etant donné la large variété de bases de données (Google Scholar, AGRICOLA, AGRIS, PubMed) aujourd'hui en libre accès sur le web, ainsi que l'information bibliographique de ScienceDirect, de JSTOR et d'autres bases de données FirstSearch incluses dans WorldCat.org dont l'accès est également gratuit, et étant donné la perception générale de l'utilisateur que la plupart de l'information est librement disponible sur Internet, ce document tente de répondre à la question: les bases de données accessibles par abonnement, indexées et incluant des résumés, sont-elles encore appropriées dans le cadre académique? Ce document identifie le but des services d'indexation et d'analyse de documents, discute le paysage actuel, et le profil des uti-

lisateurs en termes d'habitudes de recherche et leurs perceptions des forces de Google et d'autres moteurs de recherche. Ce document présente des résultats d'une étude faite à l'université de l'Arkansas, Fayetteville, identifiant les préférences d'étudiants en biologie à différents niveaux de cursus universitaire, pour les sources d'informations avant et après instruction. Ce résultat est comparé à ceux d'un cours sur des principes fondamentaux de la chimie pour montrer des modèles. En utilisant la base de données de CABDirect et le Web des savoirs comme exemples, cette étude identifie les manières dont les fournisseurs de base de données ont relevé le défi de la « googlisation » et met en exergue les perfectionnements nécessaires qui pourraient être essentiels à la survie des bases de données conventionnelles dans le futur.

**RESUMEN:** Dado la amplia gama de bases de datos (Google Scholar, AGRICOLA, AGRIS, PubMed) ahora disponibles gratuitamente en la Web, así como la información bibliográfica de ScienceDirect, JSTOR y otras bases de datos de FirstSearch incluidas en WorldCat.org de libre acceso, y dada la percepción general de usuarios de que la mayor parte de la información está libremente disponible en la Internet, este trabajo busca responder la pregunta de si las bases de datos de indización y resúmenes por suscripción aún son pertinentes en el entorno académico. Al hacerlo, el trabajo identifica la finalidad de los servicios de indización y resúmenes, discute el entorno actual y hacer un perfil de usuarios en cuanto a sus hábitos de búsqueda y sus percepciones de las fortalezas de Google y otros motores de búsqueda. Este artículo presenta los resultados de un estudio realizado en la Universidad de Arkansas en Fayetteville, donde se identifican las preferencias de los estudiantes de pregrado y posgrado de biología respecto a fuentes de información tanto antes como después de sus estudios. Para mostrar patrones, este resultado se compara con los de un curso sobre los Principios Básicos de la Química. Al utilizar la base de datos de CABDirect y la Web del Conocimiento como ejemplos, este estudio identifica maneras en que los vendedores de bases de datos han estado respondiendo al reto de la "googlización" y destaca los perfeccionamientos necesarios que pueden ser esenciales para la supervivencia de las bases de datos de resúmenes e indización en el futuro.

## Background Information

The purpose of indexing and abstracting services, now commonly referred to as databases, has been and continues to be bibliographic control and organization of knowledge in a manageable way that quickly enables researchers to identify useful information in broad disciplines. These services provide a methodological and systematic approach to the literature of a field (Manzer, 1977). These discipline-oriented databases generally aim for comprehensive coverage of material in their field, often including abstracts of foreign material that would not have otherwise been available. Collison (1971) has

reminded us that the researcher's real aim is to keep up with his subject matter rather than master the contents of so many periodicals, and the abstract journal is logically his best means of doing this. The insistence on the importance of abstracting and indexing databases is, however, largely due to the rapid increase in scientific and technological advances in this and the past century. Yet, these databases must have a purpose and respond to and satisfy the many needs of researchers who would use them. O'Connor (1996) identified these as "some people come to systems with clear understanding of what sort of material would satisfy their requirements;

some come with vague concepts, but would likely recognize something useful if it were presented; some come with no preconceived ideas but only a desire to shake up what they know in hopes of a new discovery.”

## The Information Landscape

Using databases to find information in science and technology is, of course, not new to the profession but what is certainly changing is the use of Internet technologies to obtain what we have been offering our users but with new and improved access, new methods of discovery and features that are capable of performing comprehensive analyses of the literature. In fact, our users have come to expect that ease of access to the literature, through services such as Google, Google Scholar and other search engines, is the norm rather than the exception. If we do not offer comparable ease of access to the literature as they are now accustomed to there is the risk that our users in academic and research environments might opt for less comprehensive information sources that are friendly and easy to use, even though they do not retrieve all the information that is required to solve the problem at hand.

The cost of discipline-oriented abstracting and indexing databases has also been increasing, and some have experienced such high rates of inflation, that they are beyond the reach of libraries. Smaller libraries can no longer afford to provide access to some of these subscription-based databases, relying heavily instead on those that are freely available and on subscription aggregator databases, noted below, to satisfy the immediate needs of their clientele. This may not be a terrible thing, as it allows smaller libraries to spend their limited resources to provide full-text of the items on demand. Even large institutions are constantly evaluating their resources in light of their focused research areas, the accessibility and availability of other useful freely available resources, and their clients’ searching and information-seeking behavior based on use statistics. Because of the high cost of subscriptions in the areas of science and technology, this kind of evaluation is even more pronounced in these subject areas.

## Freely Available Resources in Agriculture and Related Fields

In the area of agriculture and the life sciences, there are several databases that are now freely available on the Internet. Among the major ones are:

- *PubMed* ([www.ncbi.nlm.nih.gov/entrez/query.fcgi](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi)), the U.S. National Library of Medicine database. McEntyre and Lipman, (2001), note that “a huge amount of knowledge can be gleaned from even a basic *PubMed* search, while the use of advanced functions can add speed and focus. The 11 million or so abstracts that constitute *PubMed* undoubtedly make it one of the most significant barrier-free on-line biomedical resources.

However, the scientific abstract is but one flavor of information that we use in our professional lives: full-length research articles, clinical trials databases, molecular biology data and so on all contribute to a rich information landscape.”

- *AGRICOLA* (<http://agricola.nal.usda.gov/>), the U.S. Department of Agriculture database. This database is freely available as the articles section of the National Agricultural Library’s Catalog. The Article Citation Database includes citations, many with abstracts, to journal articles, book chapters, reports, and reprints, selected primarily from the materials found in the NAL Catalog (*AGRICOLA*). Although the NAL Catalog does not contain the text of the materials it cites, thousands of its records are linked to full-text documents online, with new links added daily.
- *AGRIS* (*International Information System for the Agricultural Sciences and Technology*), <http://agris.fao.org/>), network of over 100 participating countries coordinated by FAO. This free database includes information on all aspects of agriculture and its technology in developing countries. It contains citations and links to the full text where available. It offers fuzzy searching and boosts term options to allow higher rank specificity and thesaurus searching. It also provides links out to *Google* so that it is easy to find freely available full-text material.
- *CRIS* (<http://cris.csrees.usda.gov/>), U.S. Department of Agriculture database. *CRIS* is the U.S. Department of Agriculture’s documentation and reporting system for ongoing and recently completed research and education projects in agriculture, food and nutrition, and forestry. This is a useful database for researchers who want to match grants with their research areas and for librarians in verifying difficult citations, especially for conference presentations.
- *CARIS* (*Current Agricultural Research Information System*), <http://www4.fao.org/caris/>), FAO database. This system was created by FAO in 1975 to identify and to facilitate the exchange of information about current agricultural research projects being carried out in — or on behalf of developing countries.
- *Google Scholar* (<http://scholar.google.com/>). This free web resource provides a simple way to search for scholarly literature across disciplines and sources, including articles, theses, books, abstracts and court opinions from academic publishers, professional societies, online repositories, universities, and other Web sites.

Even though these resources are freely available on the Web, many users who are not trained do not necessarily know of their existence nor do they know the value of accessing information through these more formal information resources. They instead search *Google* hoping that they will find all the information they need. This points to an urgent need for information professionals to educate their users.

FIGURE 1 – First choice of information source (%): Biological Sciences undergraduate students



FIGURE 2 – First choice of information source (%): Fundamentals of Chemistry undergraduate students



## Characteristics of the Users

In this section I will explain the characteristics of our users and why they prefer easily accessible resources such as Google and Google Scholar instead of more targeted databases. I will then identify what should be done to attract these users to both the targeted freely available databases and the subscription databases in their research areas.

In the academic environment, there are generally three levels of potential users. These are the undergraduate population, graduate students, and faculty and researchers.

**The Undergraduate Population** – Frand (2000) alluded to the fact that most students entering our colleges and universities today are younger than the microcomputer, are more comfortable working on a keyboard than writing in a spiral notebook, and are happier reading from a computer screen than from paper in hand. For them, constant connectivity—being in touch with friends and family at any time and from any place—is of utmost importance. However, in a research paper, Selwyn (2009) challenged the popular assumption that the current generation of children and young people are innate, talented users of digital technologies. He concluded that “the capacity of young people to learn is compromised by a general inability to gather information from the internet in a discerning manner.” In referring to the “net” generation, Brabazon, (2007) lamented that “clicking replaces thinking and scholarship consists of little more than ‘googling their way’ through degree courses and engaging in forms of accelerated smash and grab scholarship.”

So it is not surprising that in a pre-test given to biological sciences undergraduate students at the University of Arkansas, Fayetteville, in the fall 2009, the majority of them identified Google as their first preference to locate information. The problem here is the lack of information literacy skills. Thus, I would strongly advocate that information professionals, while learning to live with Google and other easily accessible information sources, should also learn how to inform students of the strengths and weaknesses of these sources and the value of other formal indexing and abstracting databases that

they should really use. Our success in reaching out to these students will largely depend on how well we convince faculty of the value of information literacy and library instruction to engage students and to provide research skills that have lifelong applicability.

In this same class, the biological sciences undergraduate students were taught the techniques of finding and evaluating information in three class sessions each of one hour duration. These skills included: how to identify the concepts in a research question, how to determine what keywords to use to represent these concepts, how to use Boolean logic (*and*, *or* and *not*) in formulating good search strategies, understanding that records are more or less equivalent to a citation (but with abstracts and descriptors), and that records are made up of fields. They learned how to refine their searches (broaden or narrow) by restricting the retrieval to specific fields and by using the thesaurus. Hands-on practice sessions with specific examples were used to reinforce these techniques to find information using Biological Abstracts, CABI abstracts, Web of Science, Google Scholar, and Google.

Students conducted the same search in each of these databases, and discussions followed comparing and contrasting the results of the retrieval. A special effort was made to show what they were missing when they restricted their search only to Google, Google Scholar or other similar search engines to find the most relevant information. At the end of three sessions, students were given a post-test and asked again to identify what would be their first choice of information source for the assignment that they had to complete for the class. There was a 21 percent increase in the number of students who responded that in the future they would use library databases, including free targeted databases as noted above, but starting from the Library’s homepage (Figure 1). A similar pre- and post-test session was held for students in a Fundamentals of Chemistry class, but this class met for only a one and half-hour session. After instruction there was a 10 percent increase in the students whose first preference was to start the search using the Library’s databases (Figure 2).

**Graduate Students, Faculty and Researchers** – Many graduate students and researchers have told me in information sessions that they always use Google Scholar as a

starting point to find information. This is not surprising. At times, Google Scholar is also used as the first source to identify relevant information at the reference desk. Its multidisciplinary nature makes it a valuable source to find information that is not covered in databases with rigid indexing and abstracting policies and it eliminates the need to search several databases, each one having its own method of searching and retrieval. It also provides cited information for one to expand a search and find some useful information quickly. But I also know that if I went back to repeat my search in Google Scholar an hour later, I probably would not be able to find the exact same information again. But the fact remains that it does provide useful information on demand and without much effort.

An example that comes to mind of someone who would benefit from using Google Scholar is a researcher who needs to search the literature on agricultural machinery. Much of the literature in this field will be covered in both CAB Abstracts as well as in Compendex, which provides international coverage of the literature of the engineering field. However, researchers in the field of agriculture might not be aware of the Compendex database thereby missing out on some valuable information. If they search Google Scholar, on the other hand, without much effort they might find some of the missed references. Some libraries are trying to bridge this gap by using federated searching and other discovery systems to expose information in library subscription databases, full-text journal databases and other library resources. While federated searching could be a useful tool for the undergraduate student who might need only a few articles to write a research paper, experience has shown that these methods of searching are not adequate to handle the more comprehensive and meaningful retrieval required by this group of researchers.

The question that must be asked then, is do we need indexing and abstracting databases in the agricultural sciences and in the other areas of science and technology in light of the free resources that our users are exposed to? I do believe that discipline-oriented databases will be around for a long time, some in very different and sophisticated forms. This is because they serve an important purpose in the scientific communication process where many serious researchers cannot survive in their fields without them.

For example, most of these researchers have been trained in information literacy at some time, so they know the major comprehensive databases that relate to their research and teaching. Many of these databases have English translations of foreign language sources, thereby exposing researchers to valuable research from other parts of the world. These researchers search databases for many reasons: to keep abreast of the literature in their fields (often relying on their alerting services); to find a specific piece of information like a method of analysis; to survey the literature when starting a new project; to apply for a grant or to review a grant proposal, to identify a re-

search project for a dissertation topic; and, primarily, to avoid duplication. Comprehensive information is also very useful to identify collaborators for research projects, grants or patent applications. Many of these databases are comprehensive in coverage and contain a huge retrospective file. For example, CAB Abstracts, which is the most recognized comprehensive database in agriculture, covers the literature, worldwide, since 1910 and provides abstracts in English for nearly all records.. The full text of many conference proceedings, difficult to find elsewhere, are also included in CAB Abstracts.

Faculty, graduate students, researchers, administrators, and librarians have become increasingly dependent on databases such as Web of Science and Scopus which provide tools to analyze the literature in a field. The cited reference features allow one to identify high-impact articles and the growth of an idea over time based on their citation patterns. The analysis tools also help one to discover emerging trends that could be very useful in pursuing successful research and grant applications. Librarians have used these tools also as selection aids to study their faculty's publishing and citation patterns. In times when funds are not available, these can be good indicators of how well a library is meeting the needs of its users.

### **Traditional Database Responses to the "Googleization" of Information**

The days are long gone when users will put up with information systems that are not easy to use or that don't provide ample discovery and research tools. Our users are accustomed to using Google, Yahoo and other internet resources where they find something of relevance. Depending on the motivation, many will stop there just because it is effortless. A large number of databases are starting to mimic searching capabilities as in Google/Google Scholar in order to try to give the user the same experience they get when they use Google and other internet search engines. This is absolutely necessary since, if patrons do not use the expensive subscription resources, (and usage statistics are readily available), libraries may be forced to discontinue subscriptions.

CAB Direct is an example of a database that is trying to mimic the same experience that users are accustomed to. CAB Direct has two modes of searching—a basic search box and an advanced search box giving the user the option to choose the most relevant (Figure 3). Like Google Scholar, the results of the retrieval are ranked by relevance, but CAB Direct also has the option of sorting the records by date. Both systems have advanced search features which will allow the more sophisticated user to refine searching. For example, CAB Direct has a user-friendly feature to refine a search based on faceted display of the record by many fields. In addition to allowing links to the library's resources, CAB Direct allows the user to find those open-access articles or other materials that are freely available on the web by making links available from every record to



Google/Google Scholar. This is useful since many libraries still do not know how to harness the vast resource of open-access material freely available on the Web. CAB Direct database has also provided a range of resources for active researchers such as opportunities to build their own database in the MyCAB Direct, RSS feeds and alerting features.

## Future Enhancements of Traditional Databases

It is my belief that traditional abstracting and indexing databases that are discipline-oriented will survive in the foreseeable future in academic settings in preference to those that are general and multi-disciplinary. However, the multi-disciplinary databases will still have their place in smaller or more specialized institutions.

In the academic world, we aim to provide instruction for our users who do not have to visit the library since their library resources are accessible remotely. Database providers will have to find new and improved ways to make information easily discoverable and provide access to more full-text and open-access material. Innovative ways to provide context-sensitive help, such as suggestions on search strategies based on a user's search term, will be the norm in the future.

Many databases are providing the bibliographic record together with the references that are listed in the source items. These references are then linked to cross-referenced materials or other resources that can link directly to the library's catalog or to Google Scholar to enable retrieval of the full text. It will not suffice merely to provide a link back to the Internet; rather, the database will provide direct links to the full text articles available in most open-access journals, dissertations, conference articles, patents, etc. If all these references are included in the database, then cited reference searching and cited counts will be more widely available within disciplines. When this is achieved, I believe that more users will stay longer in their discipline-oriented databases as these will then serve as individual points for one stop-shopping. In the Web of Knowledge database, a user can study the literature based on a key reference backwards and forwards, and find very relevant references based on co-citation. If enough time is dedicated to searching, a serious user can get a comprehensive view of the literature. Analyses of the literature will also become a common feature of databases in the future, as well as citing counts and providing cited references.

The database vendors will also have to rethink their policy of access based on number of available seats. They should consider providing unlimited access to their resources since users get frustrated when access is blocked

FIGURE 3 – A basic search on the CAB Direct search page (Source: CAB Direct Interface <http://www.CABDirect.org>)

The screenshot shows the CAB Direct search interface. At the top, there are navigation links for Home, Help, and Thesaurus. A search bar contains the text 'arkansas agriculture' with a green search button. Below the search bar, the results are displayed under the heading 'Search results: arkansas AND agriculture', indicating 4 results. On the left, there is a 'Refine Results' section with filters for Specific Topic (Glycine (Fabaceae) (2), Glycine max (2), Oryza (2), Oryza sativa (2), crop rotation (2)), Subject Category (CABICODE), and Year of publication. On the right, there is a 'Tools' sidebar with options like Search History, Print selected records, Email selected records, Download Selected Citations, and Download Selected MARC21 Records. The main results area shows two entries: one about a mycoherbicide co-operative project and another about health monitoring in the U.S. catfish industry.

because seats are not available when they need the information. When that happens, they will use other alternatives. Since every use is recorded, usage pattern by the local community ultimately dictates renewal decisions., Low-use databases will eventually lead to a canceled subscription. Increasingly, databases will also have to embrace the incorporation of the changing mobile access technology as the norm.

More and more databases will provide natural-language searching in the form of a sentence, executing smart searching to seamlessly provide useful and targeted information to the user. The hidden power of the thesaurus function will not be obvious to the user, but the results will be relevant and useful and fully based on them. Cloud tags will also be available for searching in most databases. Individual researchers might need an illustration or a table from an article that is still not easy to find in conventional databases. These should be indexed to add value to the traditional database. Having a choice of many ways to visualize the retrieved set will make users more comfortable in manipulating the information and allow discovery to happen spontaneously.

It is clear that database vendors will have to scramble to devise models that provide such important features to meet users' demands but the new models also need to be affordable to libraries if they are to continue to subscribe to them, particularly since present pricing models are unsustainable.

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# Incorporating Use of a Mixed-media Information Tool Into the Work of Actors Involved in the Development of Livestock Production in Tanzania: Dissemination, User Training, Monitoring and Evaluation, and Impact

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**ABSTRACT:** Access to timely, validated information is problematic for many personnel with direct or support roles in livestock production in rural Tanzania. To address this issue, potential users were trained in the application of the Animal Health and Production Compendium (AHPC), a mixed-media encyclopedic knowledge base, with the aim of delivering the benefits of the tool to a substantial number of relevant organizations and individuals. Trainee selection, workshop facilitation and monitoring and evaluation (M&E) were achieved with the collaboration of the Tanzania Commission for Science and Technology (COSTECH). Training activities incorporated Actor Linkage Matrix methodology to engage participants in mapping information flows and identifying constraints in knowledge provision to key actors. Continuous mentoring and monitoring, coordinated by COSTECH and supported by CABI, was built into activities planned by the trainees. A final M&E Workshop collected “Most Significant Change Stories” and gathered recommendations for further activities from the participants. The trainees used information from the AHPC in testing and evaluating use of this tool by preparing extension materials, training resources and writing news and feature articles for a farmer’s magazine. Specific benefits attributed to use of this information included better decision making by extension and farmers, significant increases in cattle vaccinated against East Coast fever within one ward, improvement in the quality of research papers and proposals, and catalysing partnerships through farmer field schools. The paper identifies the challenge of implementing an effective communication channel among compendia users.

**RESUMÉ:** L'accès en temps opportun à des informations fiables est problématique pour le personnel d'appui direct ou indirect à la production animale en Tanzanie rurale. Pour résoudre ce problème, les utilisateurs potentiels ont été formés à l'application du Compendium santé animale et production (AHPC), base de connaissances encyclopédiques multi-médias, dans le but de fournir les prestations de cet outil pour un nombre important d'organisations et individus. La sélection des stagiaires, l'organisation d'ateliers puis le contrôle et l'évaluation (M&E) ont été réalisés avec la collaboration de la Commission de Tanzanie pour la Science et la Technologie (COSTECH). Les activités de formation ont inclus la méthode des matrices de liens entre acteurs pour engager les participants à la cartographie de flux d'information et à l'identification des contraintes liées à la fourniture de connaissance aux acteurs-clé. La tutelle et le suivi

continus, coordonnés par la COSTECH et soutenues par les CABI, ont été intégrés dans des activités prévues par les stagiaires. L'atelier final de M&E a rassemblé «les histoires les plus significatives du changement» et a recueilli auprès des participants des recommandations pour d'autres activités. Les stagiaires ont utilisé des informations de l'AHPC en testant et en évaluant l'utilisation de cet outil pour préparer des documents de vulgarisation, de formation et pour écrire des articles d'actualité ou de fond pour un magazine agricole. Le papier identifie le défi pour mettre en place un moyen de communication efficace entre les utilisateurs de l'AHPC.

**RESUMEN:** El acceso a información oportuna y validada es difícil para mucho personal con funciones directas o de apoyo en la producción pecuaria en zonas rurales de Tanzania. Para abordar este tema, se capacitaron usuarios potenciales en la aplicación del Compendio de Salud y Producción Animal (AHPC), una base de conocimientos tipo enciclopedia de medios mixtos, con la intención de entregar los beneficios de la herramienta a un número importante de organizaciones e individuos pertinentes. Con la colaboración de la Comisión para la Ciencia y Tecnología de Tanzania (COSTECH), se lograron la selección de pasantes, la facilitación de talleres, y el seguimiento y evaluación (S&E). Las actividades de capacitación incorporaron la metodología de Matriz de Vínculos entre Actores para hacer que los participantes participaran en el mapeo de flujos de información y en la identificación de limitaciones al suministro de conocimientos a actores clave. Se incorporaron la mentoría y el seguimiento continuos, coordinados por COSTECH y apoyados por CABI, en las actividades planificadas por los pasantes. Un taller final de S&E recopiló las “Historias de Cambio Más Significativas” y reunió las recomendaciones para actividades adicionales de los participantes. Los pasantes utilizaron información del AHPC para probar y evaluar el uso de esta herramienta al preparar materiales de extensión y recursos de capacitación y al redactar noticias y artículos principales para una revista para agricultores. Beneficios específicos atribuidos al uso de esta información incluyeron una mejor toma de decisiones por los servicios de extensión y los agricultores, un aumento significativo en el ganado vacunado contra fiebre de la Costa Este dentro de una distrito, el mejoramiento de la calidad de los trabajos y las propuestas de investigación y la catalización de alianzas a través de escuelas de campo de agricultores. El artículo identifica el reto de implementar un canal de comunicación eficaz entre los usuarios de compendios.

## Introduction

**Access to timely, validated information** is problematic for many personnel with direct or support roles in livestock production in rural Tanzania.

CABI is the coordinator of a series of global initiatives to compile the world's expertise in a particular subject area into a readily accessible knowledge base called a 'Compendium'. One of the current foci of the Compendium Programme is the Animal Health and Production Compendium (AHPC), which promotes efficient animal husbandry worldwide using resources from both developed and developing countries. The AHPC is available on the World Wide Web and on CD.

To explore the potential of the AHPC in addressing the information needs of the livestock sector in Tanzania, three workshops were implemented in Dar es Salaam to support field activities to develop and test ways in which the compendium could be used to support delivery of information to potential users including farmers. The aim of the workshops were to a) demonstrate the tool to a substantial number of organizations and individuals involved in agricultural and livestock-related activities and b) explore ways in which the information in the compendium could be delivered and, in the second and third workshops, create awareness of the tool to more livestock-sector stakeholders, including a greater number of participants from rural locations, showing them how to search and use the information within it, building on the experiences of participants in the first workshop.

The Tanzania Commission for Science and Technology (COSTECH) is a government organization, with its headquarters in Dar es Salaam, which promotes scientific research and the compilation and dissemination of scientific knowledge throughout the country. COSTECH was identified at an early stage of this project as the most suitable in-country counterpart for cooperation in delivering the planned activities.

An important component of the planned activities was to establish the basis for mentoring the trainees and monitoring use of the AHPC and its possible benefits and impact. The trainees established work plans for follow-up activities aimed at using and promoting the AHPC to colleagues or other stakeholders in the livestock sector and to test and evaluate different ways of using information from the compendium. They identified appropriate indicators for monitoring progress in implementing the planned activities. They identified constraints to dissemination and use of the compendium, particularly in the channeling or repurposing of information for field-level application. Further objectives of the training included motivating participants and assisting them in identifying gaps in information flows that could be filled by using the tool.

## Methods

**Planning and partnership building** – In two visits in February and March 2008, CABI staff, with the assistance of COSTECH, visited Tanzania and held discussions at key institutions to identify potential participants and key individuals within institutions that would support participation in the forthcoming workshops and dissemination activities.

**Training on accessing information in the compendium and planning learning activities to test use of the tool by livestock sector stakeholders** – In three workshops held in Dar es Salaam on 13–15 May 2008, and 8–9 and 10–11 June 2009, 50 livestock sector stakeholders were trained in searching and accessing information within the Animal Health and Production Compendium (AHPC). Participants included field-level staff from the public and private sectors, researchers, extension workers, trainers from agricultural colleges and industrial farms, university lecturers, veterinarians, input suppliers, farm managers, private sector farm information-service providers, rural ICT trainers, policy makers, mainly from the local government, and one farmers' magazine editor. Participants were chosen with the aim of delivering the benefits of the AHPC to a substantial number of organizations and individuals involved in agricultural and livestock-related activities. Trainees were drawn from fourteen regions of Tanzania; Dar es Salaam, Tanga, Morogoro, Kilimanjaro, Mbeya, Mara, Dodoma, Arusha, Mtwara, Mwanza, Tabora, Rukwa, Iringa and Pwani. Over half of the main facilitators in the project were women; however, only six of the 50 participants in the AHPC workshops were women. There is evidence that this gender imbalance reflects the workforce in livestock-related professional services (see for example, Niamir-Fuller, 1994).

The workshops were intended to expose the potential users to the compendium as a tool that could provide information to support their work. Trainees shared ideas about different ways in which they anticipated that they could use the tool in their work. Each participant was given a copy of the compendium and training materials to use in promoting the tool to their colleagues and to test how it could be used in the development of the livestock sector.

The workshops focused on four themes.

- Mapping and identifying the main actors in the livestock development sector, the information flows between them, and the constraints and limitations of these information flows. An actor linkage matrix approach was used for this process, which helped to identify the gaps in information flow and areas where information from the AHPC could be particularly beneficial.
- Training on how to find information in AHPC, followed by demonstrations, hands-on exercises and question and answer sessions. Simple training materials were used and given to participants to take away for further self-learning and to assist in training colleagues.

- Activity planning, where participants drew up individual work plans on how they would use information from the compendium to fulfill specific, measurable, attainable, relevant and time-bound objectives based on identified needs, focusing in their work and that of other actors in the livestock sector. Planning included defining how to evaluate the impact of information from the tool.
- A reporting strategy was agreed on, including use of a blog site, the 'AHPC users blog site' [ahpcusers.ning.com]. The blog site provided a platform for reporting and communicating between and across project beneficiaries and actors.

**Mentoring trainees and monitoring use of the Compendium** – CABI and COSTECH staff carried out four visits to mentor the participants and monitor how they were using the compendium and how they were implementing their planned activities. Continuous mentoring was mainly based on email and telephone communication, while visits were carried out at intervals of two to four months following the workshops. During the visits, meetings and interviews were held with participants, referencing their work plans. Actions implemented and those not implemented were identified as well as constraints to executing the plans. Where appropriate, employers of workshop participants were lobbied to support their employees in carrying out their planned AHPC-related activities. As well as face-to-face interviews, reports were received from workshop participants by email and as communications to the AHPCusers blog site.

A final monitoring and evaluation workshop was held in Dar es Salaam near the end of the project on 30–31 July 2009. It brought together nine participants who had attended previous workshops, representing researchers, trainers, livestock-sector extension workers, the media, librarians, and other service providers in the livestock sector. They shared their experiences in using the compendium and recorded their 'Most Significant Change stories' (MSCs) in using or promoting use of the tool. The stories were categorized according to impact using a procedure based on Davies and Dart (2005). Unfortunately, only a few MSC stories were captured because of the low turn-out of trainees for this workshop, which coincided with other national events that some had to attend.

Information on constraints in the use and dissemination of the tool, and recommendations for next steps in furthering the objectives of the project were presented by the participants to seven policy-level managers, mainly from the Ministry of Livestock Development, who attended the closing session of the workshop.

## Results

**Use of the Compendium** – Primarily, the trainees used information from the compendium in their extension, research and training activities. For example the information was used to write research proposals, implement research activities, train livestock extension

workers, write for the media, advise farmers on aspects of livestock production such as construction of proper housing for poultry in Rufiji district or advise on construction of abattoir in Mkuranga district. Information was also used as reference material by university students. Importantly, the compendium was used to support identification and diagnosis of livestock diseases. It had become a vital reference tool in developing responses to urgent problems such as Avian influenza and swine influenza.

Information from the compendium was used to prepare training materials for seven training programmes reaching over 3000 farmers and livestock keepers. Extension materials on topical issues such as common livestock and poultry diseases were prepared and disseminated during the Nane Nane Agricultural shows. Training resources were produced at a Livestock Training Institute. One journalist used the information to write news and feature articles in farmers' magazines with a circulation of 10,000 across 23 of Tanzania's 26 regions. Table 1 summarizes the key purposes for which information was used.

**Dissemination and awareness-raising activities** – Trained participants conducted awareness and training of extension workers, farmers, students and, to a lesser extent, researchers, based on information from the AHPC. Four major AHPC awareness-raising events and many smaller activities, such as demonstrations of the compendium in staff meetings, were held. In fact, about 900 individuals were introduced to the compendium by participants in the training program. These included presentations to 150 veterinary and para-veterinary delegates at a pre-conference workshop held before the Tanzania Veterinary Association (TVA) Conference, January 2009, in Arusha, and to over 425 delegates during the main TVA conference. Other presentations were made to over 200 extension workers, 40 farmers, 100 researchers and para-veterinarians, eight milk processors and five veterinarians. The AHPC was also featured at conference exhibitions at the annual Nane Nane agricultural show in August 2008 and 2009. The event is attended by hundreds of agricultural-sector stakeholders including farmers, extension workers, researchers, input suppliers and the agro-processing industry. Flyers and posters using information from the AHPC were also disseminated at these shows.

**Challenges to testing and evaluating use of the compendium** – In promoting access to information from the compendium, especially to farmers and field-level practitioners, the trainees encountered several challenges that hindered maximizing use of the information available.

- Inadequate ICT capacity. For most trainees and potential users Internet access was expensive, unreliable or absent, thus access to the Internet version of the AHPC was difficult or impossible. The CD version was the preferred method of access.

TABLE 1 –Use of information by category of participant in the livestock sector

Category of Participant	Purpose for which information from the AHPC was used								
	Making decisions/giving advice on disease management & livestock production issues	Demo. of AHPC to work colleagues	Demonstration at outreach meetings for extension workers/agro industry	Prepare extension materials to advise/train farmers (directly)	Prepare materials for training students (diploma or degree level)	As a reference tool	Prepare research proposals/use in research work	Writing articles for the media (national/institutional)	Prepare materials for exhibitions at agric. shows & demos of the compendium
<i>Journalist/Media</i>	●	●	●	●				●	●
<i>Researcher</i>	●	●	●			●	●		●
<i>Farmer/Farm Manager</i>	●								
<i>Extension (Field/district)</i>	●	●	●	●					●
<i>Trainer (College)</i>		●			●				
<i>Policy-level manager</i>		●					●		●
<i>Input &amp; Information service provider</i>	●		●	●		●			
<i>Librarian/Lecturer</i>		●				●		●	

- Language was a barrier to the direct transfer of information from the compendium to farmers, who, if they were literate, were most likely only to read Swahili. Therefore material had to be repurposed and translated by intermediaries before it could be used for teaching or demonstrating at farmer/livestock owner level. This proved to be expensive, especially when photographs, which were found to be particularly useful for field-level training, had to be reproduced.
- Lack of monetary and practical resources. Although the compendium was considered an excellent source of information, most potential users did not have funds to buy further copies (at US \$150 each) and requested free copies or subsidized prices. Lack or unreliable supply of other resources such as power and transport also hindered trainees' capacity to facilitate the transfer of information from the compendium.
- Communication – one of the aims of the project was to facilitate communication between trainees so as to allow them to help each other to use the compendium. It was anticipated that the AHPC users' web site would facilitate this. Although over 20 participants joined the

website, the facility was actually used by only four participants, with most contributions coming from just two. This represented a poor uptake of this channel of communication, but is not a surprise given the limitations of Internet access for many of the participants noted above.

**Benefits and impact of the Compendium** – The compendium has benefited the participants in two ways; by improving their way of working, and through changes resulting from using information from the compendium. The benefits of the latter extend beyond the initial trainees, reaching their colleagues and other stakeholders such as researchers, extension workers, trainers, farmers, and others who were trained to use information from the compendium by workshop participants.

Specific benefits attributed to the Compendium include better informed decision making by extension workers and farmers, improved quality of research papers, and catalyzed partnerships among livestock-sector stakeholders. For example, farmer field schools (FFS) were established with livestock management as a major

activity for which the AHPC would be used as a credible source of information. At the district council level, awareness of the compendium has fed into plans to equip employees with computers and other information resources and has added weight to bids for capacity building projects and acquisition of related resources. In Kilosa District, the compendium has been institutionalized as a reference source for extension staff to use as a decision support tool. Meat inspectors in Kilosa District used the AHPC to back up decisions to condemn carcasses due to risk of zoonotic diseases. One instance of conflict resolution was reported where the District Agriculture and Livestock Development Officer used the compendium to placate angry meat sellers after loss of a carcass was reported. In one of the wards near Chalinze, Pwani Region, a para-veterinary extension officer reported the number of cattle vaccinated against East Coast fever increased from 2,000 to 6,000 (out of a population of 15,000) after showing farmers extension materials created using the AHPC.

The compendium has empowered and motivated the trainees and the other stakeholders who have access to the information to make decisions with confidence. Before receiving the compendium, many of the trainees had limited access to current technical and scientific information and were relying on old reference sources such as their personal text books. Some trainees describe the impact in their own words in the testimonials below.

**TESTIMONY 1** – At the Nane Nane Agricultural Show, we were giving awareness about avian influenza and swine influenza, which had hit our country recently as part of the “National Avian Influenza: Emergency Preparedness and Response Plan.” During the show I was able to meet a lot of different people including small and large scale farmers, businessmen and women, politicians, government officials. Thanks to the knowledge I have obtained from the AHPC, I was able to explain the situation of Avian Influenza and Swine influenza with confidence. – **Dr Deogratius Mukangi, Veterinary Investigation Centre, Dar-es-Salaam, July 2009**

**TESTIMONY 2** – I used information from the Compendium to create awareness on the problem of tsetse and trypanosomosis to the communities in affected villages of Urambo district, Tabora region and in Lindi. In the latter, a total of 21 field staff and 229 livestock farmers were trained on the techniques of controlling tsetse flies and were provided with some materials for operations. Several flyers on Tsetse control techniques were produced and disseminated to farmers and extension staff in these areas and also at the Nane Nane Agricultural Show held in Dodoma in July 2009. As a result of the training, farmers gained confidence in using the tsetse control techniques. They formed village tsetse control teams, on their own initiative, to lead and coordinate the control activities. Before the training, the farmers had little or no knowledge about the ill-effects of trypanosomosis and did not know how to control the tsetse flies. As a result the training and for-

mation of the village control teams, the tsetse fly populations declined to the extent that there was no more ‘Nagana’ and no sleeping sickness victims in their villages. [NOTE: ‘Nagana’ is a disease of vertebrate animals caused by trypanosomes, which are transmitted by tsetse flies. Infected animals suffer from fever, weakness, lethargy, weight loss and anemia; often the disease is fatal.]

– **Ezekia Mwambembe, Department of Veterinary Services, Ministry of Livestock and Fisheries, July 2009**

At the beginning of the project, the Most Significant Change Technique (MSC) developed by Davies and Dart (2005), a form of participatory monitoring and evaluation that collects the most significant (MS) change stories, was identified as one of the methods of evaluating possible impacts of the AHPC. The technique was introduced in a facilitated session during a final stakeholder workshop. Each participant was asked think about their own MSC story before writing it down and presenting it. The stories covered significant changes that the participants as individuals or the people that they have influenced, had experienced since they were trained to use information from the compendium. The stories qualified as MSC if they met at least two of the three set criteria namely:

- increased knowledge (of individual or target institution/population)
- increased access to knowledge (for the individual or target institution/population)
- clear demonstration of improvement in livelihoods of target population.

A step-wise approach was used to identify the MSC stories.

**STEP 1: Preparation** – For each story, participants provided the following information:

- A brief introduction of the participant who was recording/presenting the story and the time that the event took place
- The story, i.e. what happened
- Significance of the events to the participant presenting the story

Participants were also encouraged to categorize their stories under any of the following five domains:

- Impact (changes) on livestock development i.e., actual technical impact at farmer (or other) level
- Dissemination and spreading awareness of the AHPC (spreading the word about the Compendium’s availability to potential uses)
- Changes in participants’ way of working (work practices)
- Other unanticipated benefits
- Negative change stories, or lessons learned, but reported positively, e.g., as areas needing improvement.

**STEP 2: Story telling** – Some participants presented more than one MSC story. However, some stories did

not meet at least two of the set criteria. Each participant was asked to select one story that they thought represented the most significant change (impact) as a result of their participation in AHPC project activities (training workshop and/or access of information, etc.). Eight stories were selected and it was agreed that the rest of the stories (rated as significant, though less important) would be recorded in the participants' activity reports that were submitted to the project coordinator.

**STEP 3: Discussion: facilitators and participants discussed the stories presented** – During a plenary session participants and facilitators discussed the MSC stories to clarify and agree on the domains to which they belonged. The outputs were summarized on a flip chart as: title of the story, reasons given by the presenter for selecting each story as most significant; the domain for each story, etc., while the detailed stories were included in the final project evaluation report.

**STEP 4: Final evaluation and ranking of the Most Significant Change stories** – A team of three facilitators conducted the evaluation and scored the eight selected as Most Significant Change (MSC) stories. The scoring was based on the three criteria as noted above. Each criterion was allocated a weight of 1 point and also sub-divided into tenths to allow scoring in cases where the criterion was only partially fulfilled. The outcome of the evaluation (Table 2) was that all eight stories met at least two of the set criteria, although to varying degrees. Reasons for only partial attainment of set criteria included:

- short implementation times for some initiatives/activities, which made it difficult to demonstrate change
- some stories did not have sufficient information to demonstrate increases in knowledge, access to it, how the target audience used the information received, or what the resulting change was. Although quantitative information was not a strict requirement here, such information would be needed in future assessments to show clear evidence of change i.e. the status before and the status after.

Some stories, however, showed added-value, for example, by attracting support/resources from policy makers, so they earned extra tenths of points. Among the selected MSC stories, there were none falling in domain 1 = Impact on livestock development and 5 = Lessons learned, mainly because of lack of sufficient information to qualify the available stories. There may also have been fewer stories listed under domain 5 because participants were more personally motivated to demonstrate their success in using the compendium than in identifying negative issues or areas for improvement in the activities.

## Discussion

It can be concluded that the Animal Health and Production Compendium (AHPC) has a lot to offer the

livestock sector in Tanzania, both in knowledge provision and as a resource for the production of teaching materials tailored for specific audiences. One remarkable 'story' of impact is from a paraveterinary extension officer who significantly increased the number of cattle vaccinated against East Coast fever in his ward by using demonstration materials derived from the AHPC to educate and convince livestock owners to vaccinate their animals. The allocation of resources such as computers, by the Kilosa district administration, to enable extension staff to access the compendium and their plan to establish centres to provide access to information at village levels is also remarkable. This shows how a tool such as the compendium can stimulate policy changes.

The compendium and associated training to use it appeared to have a greater impact on extension workers at field level than on academic researchers. Difficulties experienced at the field level attributed to the relatively complex scientific and academic nature of much of the content, were offset by the access to abundant information and the help the compendium gave to individuals working in remote, rural environments who had previously had little or no access to reference materials.

There were several constraints to maximizing use of information from the compendium and they need to be addressed in similar initiatives in future.

- The ICT capacity of the potential users of the tool needs to be assessed to ensure it is adequate. IT skills, computers, reliable Internet connectivity (if required) and power supply are all important considerations. Training in basic computer skills should be considered in future initiatives.
- Use of local intermediaries or facilitators ensures credibility and national or regional ownership of the activities.
- The impact of the tool at field level could be increased if resources are made available to translate and repurpose information for users who only understand local languages.
- Transport, stationery and other resources, which are required to implement awareness-raising and training activities, should be provided.
- In order to scale-out, more people with wider influence need to be trained.
- Access mechanisms and communication channels used for monitoring and mentoring activities should be easy to use, affordable and sustainable.

The main lessons for wider application of this type of project are as follows:

- In-country, institutional support for project activities from COSTECH was a very important factor in the successful implementation.
- The project showed that it is important to have a good understanding of the roles of the relevant organizations in the target sector in order to select participants

TABLE 2 – Most Significant Change Stories as a result of using the compendium

Domain	Title of Story	Why trainee considers story a most significant change	Impact of using information from the AHPC compendium	Score (Points)
Change in work practices	Lugoba cattle vaccinated against East Coast fever (ECF)	Better extension services (advice) were provided using knowledge from the AHPC. This has positively influenced farmers' decision-making.	Increased vaccination against East Coast fever from 2000 to 6000 animals out of a population of 15,000.	2.8
Change in work practices	Poultry keeping set to improve in Rufiji	Awareness creation and extension activities led to improvement in farmers' knowledge and have empowered them to demand more information about poultry keeping	Poultry farmers in 19 villages of Rufiji District, were able to forecast and diagnose diseases. Incidence of poultry diseases reducing.	2.3
Change in work practices	AHPC: Seeing is believing	Successful demonstration of the AHPC as an easy to use and relevant source of information facilitated its use by researchers and trainers who are using it to prepare training materials.	Increased quality of training materials and research proposal; saving of time in searching for information	2.2
Change in work practices	AHPC on the move in Mkuranga	The AHPC is contributing to improve the knowledge of extension staff (livestock/human health)	Credible information has catalyzed partnerships through establishment of monthly inter-departmental exchange meetings on zoonotic diseases	2
Dissemination/awareness	AHPC Awareness creation at Sokoine University of Agriculture (SUA)	There has been increased use of the AHPC (0–15 users/students) over a 2-month period.	Increased demand for scientific information from the compendia	2
Other unanticipated benefits	Pleasant surprise for researcher as he secures 30 million Tanzania shillings (about €16,000) for research on tsetse and trypanosomosis	Throughout his career, the scientist had never won research funds and he attributes this success to the information from the compendium, which he used to develop his proposal.	Research proposal was awarded €16,000 and project implementation has begun in Mkuranga, Kisarawe and Rufiji districts	2
Dissemination/awareness	Promoting the AHPC as a reference tool for trainers and students	The compendium is a reliable source of information and helps to fill the gap in training resources in livestock training colleges	Improved quality of teaching materials at 5 Livestock Training Institutes	1.8
Dissemination/awareness	AHPC a resource for developing training materials at the Open University of Tanzania (OUT)	The compendium provides concise, up-to-date information which is being used to prepare relevant curricula and training materials for the university	Not yet established	1.2

who will be the most effective in using and promoting use of the tool.

- Gender balance is difficult to achieve, especially where institutions with an inherent gender imbalance are asked to send their own representatives to events. However, it is important that both men and women are targeted in order to ensure impact from increased access to information by livestock sector stakeholders.
- Delivery access mechanisms that are affordable to the majority of potential users should be adopted.
- Despite the challenges of local languages, monitoring and evaluation activities confirmed the value of illus-

trations in the production of effective extension and training materials, which had tangible impact on informing farmers and livestock keepers at the field level of the value chain.

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# Documentation for Building and Sharing Agroecological Knowledge

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**ABSTRACT:** For 25 years, the work of ILEIA and its partners has been shaped by the idea that millions of small-scale farmers, together with all those who work with them, experiment and innovate in their daily work, helping increase their technical and economic autonomy and raising productivity and incomes in an ecologically sound way. With the publication of our quarterly, our main objective is to make these innovations visible as examples of an alternative model of development. Sharing knowledge also points at the development of social networks based on shared identities, aiming at unity amidst diversity. This paper looks at the results achieved in terms of information exchange and knowledge building. A major difficulty we regularly face is the lack of written material. Field visits show that farmers and practitioners regularly innovate, and thus actively contribute to the “body of knowledge” on sustainable agriculture. But these processes are often not written down, limiting the possibilities for dissemination and wider use. To address this we started a documentation programme, with which, by focusing on a detailed description and a thorough analysis, we want to help “unearth” more experiences, contribute to their analysis and wider dissemination, and, in this way, contribute to the field-based generation of knowledge on agroecology. Running this documentation programme also helped us identify the challenges which all documentation processes face.

**RESUMÉ:** Depuis 25 ans, les travaux de ILEIA et de ses partenaires ont été façonnés par l'idée que des millions de petits agriculteurs, ainsi que tous ceux qui travaillent avec eux, expérimentent et innove dans leur travail quotidien ; cela les aide à accroître leur autonomie économique et technique augmente la productivité et les revenus d'une façon raisonnable d'un point de vue écologique. Avec la publication de notre revue trimestrielle, notre objectif principal est de rendre ces innovations visibles comme exemples d'un modèle alternatif de développement. Le partage de la connaissance montre aussi le développement de réseaux sociaux basés sur les identités partagées, en visant l'unité parmi la diversité. Ce papier examine les résultats réalisés en termes d'échange d'informations et de construction des connaissances. Une difficulté majeure à laquelle nous faisons régulièrement

face est le manque de matériel écrit. Des visites de terrain montrent que les fermiers et les praticiens innove régulièrement et contribuent ainsi activement “au corpus de connaissance” sur l'agriculture durable. Mais souvent, ces processus ne sont pas écrits, limitant les possibilités de diffusion et d'usage plus large. Pour traiter ceci, nous avons initié un programme de documentation, avec lequel, en nous concentrant sur une description détaillée et une analyse minutieuse, nous voulons aider à “déterrer” plus d'expériences, contribuer à leur analyse et une diffusion plus large et, de cette façon, contribuer à la génération de connaissance de terrain sur l'agroécologie. Mener ce programme nous a aussi aidés à identifier les défis auxquels tous les traitements de la documentation font face.

**RESUMEN:** Durante 25 años, el trabajo de ILEIA y sus socios ha sido configurado por la idea de que millones de pequeños agricultores, junto con todos los que trabajan con ellos, experimentan e innovan en su trabajo diario, ayudando a aumentar su autonomía técnica y económica y elevando la productividad y los ingresos de manera ecológicamente segura. Con la publicación de nuestro boletín trimestral, nuestro objetivo principal es hacer que estas innovaciones sean visibles como ejemplos de un modelo alternativo de desarrollo. Compartir conocimientos también significa el desarrollo de redes sociales basadas en identidades compartidas, apuntando hacia la unidad en medio de la diversidad. Este artículo considera los resultados logrados en cuanto a intercambio de información y construcción de conocimiento. Una dificultad grande a la cual nos enfrentamos regularmente es la falta de material escrito. Las visitas de campo muestran que los agricultores y profesionales innovan con regularidad y, por lo tanto, contribuyen activamente al “cúmulo de conocimientos” sobre la agricultura sostenible. Sin embargo, a menudo estos procesos no se documentan por escrito, limitando las posibilidades para una mayor difusión y uso. Para abordar este problema, comenzamos un programa de documentación, con el cual, al enfocarse en una descripción detallada y un análisis cuidadoso, queremos ayudar a “desenterrar” más experiencias, contribuir a su análisis y mayor difusión y, de esta forma, contribuir a la generación de conocimientos sobre agroecología basados en el campo. La ejecución de este programa de documentación también nos ayudó a identificar los retos a los cuales se enfrentan todos los procesos de documentación.

## Introduction

Many different analyses of the world's agriculture sector have been made during the past few years, and most of them point to crises and difficulties. The number of hungry people has risen to above a billion, showing serious problems of food production and distribution. Environmental degradation is having a serious impact, while weather conditions are becoming increasingly unpre-

dictable. In addition, the rising costs of manufacturing agrochemicals, or of all activities related to processing, packaging or transporting food, means higher prices for the consumers. These difficulties have been clearly presented by the IAASTD report, which concluded that the strategy followed for promoting agricultural growth in developing countries “has failed”, and that “business as usual is not an option” (IAASTD, 2009).

At the same time, we see a growing recognition of the

important role that agriculture can play in development. The World Development Report 2008 makes a convincing argument for agriculture as a driver of development. The same can be said of publications resulting from recent meetings or conferences of the International Monetary Fund (IMF), the G8 and The New Partnership for Africa's Development (NEPAD), or the Commission on Sustainable Development (CSD). Recognising the relationship between agriculture and climate change, the Copenhagen Climate Change Conference led to the establishment of a Global Research Alliance on Agriculture Greenhouse Gases. Finally, this growing recognition is also seen in the donor community. After several years where agriculture was not part of the international cooperation agenda, many development organisations are now willing to support projects and programmes which focus on agriculture.

There is a growing recognition of the role which agriculture can play in rural development, together with a growing recognition of the need to have a different approach to development. The organisations and networks which promote this change are also increasingly visible. Some of the practices which show a different approach, for example, how agriculture, and in particular small scale agriculture, is *already* contributing to rural development, still do not get the visibility they deserve—even though these practices are found in every country, under every context or circumstance.

## ILEIA and the AgriCultures Network

ILEIA, the Centre for Learning on Sustainable Agriculture, defines itself as a knowledge and information “powerhouse” on small-scale agriculture. Its mission is to help make local innovations visible, to connect relevant stakeholders with information in order to generate dialogue, and thus facilitate the worldwide adoption of sustainable agriculture practices.

For 25 years, ILEIA has been publishing a quarterly magazine. Known for a long time as *LEISA Magazine*, this has recently changed its name to *Farming Matters*. With this magazine we aim to exchange opinions and ideas, providing practical examples of how sustainable, small-scale farming contributes to providing food security, social justice, a healthy environment and rural (and also urban) development. Throughout the years, ILEIA's main achievement has been to identify initiatives and interesting developments taking place at the local level and to publish information about them for a wider audience. But more than just presenting information or improving the availability of relevant information, ILEIA seeks to be a link that connects local experiences to global issues (and vice versa), providing a platform for sharing the lessons resulting from the work which is taking place in different countries, regions and continents.

Fifteen years ago, ILEIA decided to work more actively with partner organisations in other regions of the

world. This led to the publication of similar magazines, in languages other than English, which reached countries and readers that *LEISA Magazine* did not. In the course of these years, what started as a single bulletin has gradually turned into a set of eight magazines, all of which reach more than 45,000 subscribers in more than 150 countries. The total readership is estimated at about a quarter million. Since 2009, ILEIA and the organisations behind these magazines have constituted the AgriCultures Network.

**RESULTS** – Regular surveys show an increasing number of readers, and these surveys are complemented by the letters which we regularly receive. These show that the articles which are published every three months are regularly used as training material, are distributed in workshops and seminars, and are also used in universities or agricultural education institutes. These are copied, reprinted, and in many cases also translated into other languages. They are also used for awareness purposes. Quoting one of the letters received, for example,

*this article served as inspiration for a journalist in Kenya to produce a news item for a German television network... the resulting piece was watched by approximately 23 million viewers.*

The magazines are also used by policy makers. A Tanzanian MP was proud to say that he regularly uses the information provided during parliamentary discussions in Dodoma.

But perhaps the most interesting results are those which inspire others to experiment and innovate. The information presented in the different magazines regularly inspires readers to try out ideas, and helps them develop their own ideas and then put them into practice. One of the many examples refers to SRI, the System of Rice Intensification. First mentioned in an article written by Norman Uphoff and published in 2000, the information presented in various issues has encouraged readers to try it out—and also to contact authors and then to write an article and share their own experience. One of these readers is Rajendra Uprety, an agricultural extension officer in Nepal. In March 2009, he wrote how

*at the bottom of the December 2000 article I found the e-mail address of the author, so I decided to write to him. He sent me a lot of information....*

This information helped him set his own SRI fields, with positive results. Two pieces written by Mr Uprety himself, showing these results, were also published in our magazine in June 2005 and in December 2006.

Later, we heard how these two articles motivated others to try out SRI in different areas—a very encouraging snowball effect.

*I read the article written by Rajendra Uprety and contacted him to get more knowledge about SRI and how it works... Many farmers now want to adopt this new method of rice cultivation. This is all due to the inspiration we got from the LEISA magazine. (Umersh Achaya, e-mail sent 11 January 2010)*

Readers are inspired to try out ideas and exchange information, and thus also become authors. And as authors, they see many benefits from writing for our magazines and being widely read. As a Cuban researcher said,

*LEISA has always meant recognition of new ideas. Many times it is very difficult to bring these new ideas into a journal. At the same time, LEISA has been a very important "expansion" element. As a researcher, I have to invest more than one year's time to write a paper for a journal, but this is read by no more than 150 or 200 persons. But if I do the same with LEISA, then I get a much much bigger readership. I think that LEISA gives a good space for those interested in transforming reality. This is important.* (Humberto Rios, interviewed April 2009)

**DOCUMENTATION PROGRAMME** – The large number of development experiences taking place all over the world are easy to see when in the field. Working together with civil society organisations, NGOs, community-based organisations, and many public institutions, millions of small-scale farmers experiment and innovate in their daily work. As can be expected, not all these efforts are successful. But in all of them, the will and dedication of those involved leads to interesting results, all of which can be analysed in order to identify limitations, favourable conditions and impact achieved. One of ILEIA's main tenets is that every one of these experiences can result in a learning process if it is properly studied by those involved in it.

Sadly, experience shows that this does not happen often enough, for many different reasons. Recognising that this is a major bottleneck for the exchange and dissemination of information, ILEIA and its partners started a specific programme in 2007 for increasing the documentation of small-scale and sustainable agriculture practices and experiences. Documentation is understood as a process which seeks to organise information from a given practice or experience, in order to analyse it and draw lessons from it. This programme has been implemented since 2007, with three main objectives:

- Capacity building of regional partners to document field experiences;
- An increased documentation of these experiences; and
- The validation of documentation methods and the dissemination of results.

Until now, the most important outcome of this programme has been the increased awareness of the importance of documenting and building knowledge on the basis of practical experiences. This has led to more articles being written and published in our magazines and elsewhere. It has also led to stronger linkages among practitioners and to a greater exchange of information.

**MAIN ACTIVITIES** – Our work started with the publication and distribution of a short manual, "Learning from experience", meant to help partners describe and analyse their work. More than a method, this manual put together the recommendations given by several guides and methodologies which recognise the importance of:

- Organising the information available with the help of a set of tables;
- Analysing it in detail to understand what happened;
- Drawing conclusions which help generate new knowledge; and
- Presenting and sharing these results in a chosen format.

As a result of the direct involvement of ILEIA and some of its partners in documentation processes, this manual has been used by different organisations during the past three years. Cases include, among others, the work carried out by IADO in Isangati in Tanzania, the projects carried out by VETAID in Mozambique, the efforts of the SEE Foundation in Inner Mongolia (China), the different DURAS projects in Southeast Asia and in West Africa, the rights-based projects of CONCERN in Tanzania and the farmer-led approach projects supported by MISEREOR in India and Bangladesh. We were also happy to see that this manual has been used by other organisations, without our involvement, resulting in documentation processes taking place, for example, in Pakistan (carried out by Intercooperation), in Peru (by El Taller), in Tanzania (by Katani Ltd.), and more recently in Cameroon (by CENDEP).

These cases have led to some articles being published in the *LEISA Magazine* and in other media and information being presented in funding proposals and in public relations material. But the overall results have been broader. One of the most interesting outcomes of the documentation processes has been the opportunity for partners to learn about their own work, and to be able to share these lessons with other like minded institutions. Quoting one of the participants in a workshop carried out in Vietnam:

*We didn't know how much we needed to do this until after having done it.*

Another participant from Pakistan (June 2008) noted:

*It is during this process that I've learnt most about my project.*

Still another participant from Tanzania (June 2008) commented:

*This is simple and straightforward, and therefore very adequate... You learn even without noticing that you are learning.*

In addition, we have been able to identify some of the major difficulties which practitioners face when starting a documentation process. Why do organizations document their work? What exactly are they interested in documenting? Who is involved? Looking in detail at many different processes, we have identified a set of lessons, all of which are meant to help us and others plan and carry out better documentation processes.

#### **WHY DO ORGANISATIONS DOCUMENT THEIR WORK?**

– Perhaps the objective most commonly mentioned by organisations is the desire to

*show what we do,*

and then share their work with others:

*we want more people to know what we do and what our role is in social progress* (SEE Foundation, October 2007).

Naturally, this is the reason why some organisations have been keen on publishing their work in the LEISA magazines. In some cases this has been especially aimed at donors: showing what an organisation does is a logical step when trying to secure financial support for future work.

But outsiders are not the only ones to learn: organisations engage in a documentation process in order to learn themselves, and thus improve their own work. Quoting a participant in one of the DURAS workshops, their aim was

*to facilitate a greater understanding of what happened and what did not happen in order to draw lessons and conclusions which will feed into improving future project activities. (June 2008)*

An IADO staff member put it clearly:

*We are a learning organization.*

At the same time, by purposefully involving different stakeholders in the documentation process and by aiming at a detailed exchange of ideas and opinions, organizations achieve another important objective — to develop a collective reflection process. Seminars were organised by ABA in Brazil to establish networks to help those working around similar issues get to know each other. These networks are seen as settings which help break the feeling of isolation which many practitioners experience. This can lead to empowerment of key stakeholders such as farmers which is an expected result of participation in such a network.

**WHAT TO DOCUMENT?** – The manual published in 2007 spoke of documenting experiences from many different development initiatives taking place all over the world. These initiatives included single, short activities, projects or longer or more complex programmes — all identified as technical processes or interventions. Our work with DURAS showed both the possibilities and the difficulties of documenting a social innovation process such as the establishment of partnerships between organisations. Those involved in this exercise saw that

*the way of structuring the information and analyzing it can be the same, regardless of the type of project.*

Participants also noted that

*the problem is not in the activities or processes being documented, but in those who are involved in the process.*

In this case researchers were interested in showing the results of their research, instead of showing what was achieved in terms of linkages or partnerships.

But whether we were looking at technical or at social innovations, our interest was on stories from the field. This led some participants to refer to best practices and to aim at developing recommendations on the basis of these practices. This approach was not taken by all, considering that “best” or “good” are terms which are specific for a given context, and the main objective of a documentation process is not to produce an inventory of

what works best for a given context, but rather to extract the main lessons. One of the lessons we drew was that most of these experiences are in fact processes which have unexpected results — so we are not really aiming to look at a practice as a result of a process, but rather at the process itself.

Finally, all cases showed the importance of drawing specific boundaries and not being overly ambitious. Documenting a broad project in detail can be difficult, and can risk becoming an unmanageable process. This was resolved in one case by having various documentation processes going on simultaneously. In other cases, the logical solution was to look at a narrower set of activities or at a shorter period of time.

**WHO IS TO BE INVOLVED?** – As expected, all organisations mentioned their interest in reaching as many stakeholders as possible. If documentation is to be a participatory process, as all guides or manuals say, then the active participation of a broad set of actors is expected. Factors such as time and resources, however, showed that this is not so easy. While trying to get as many people involved as possible, one team also aimed at working with a representative sample of those that were involved in the field experience which was being documented. Do they have the time? Are they interested? This all confirmed the need to think about the important role which the “owners” of an experience have in its documentation.

The participants also considered the importance of coordinating the participation of many different stakeholders and dealing with disagreements, especially when thinking of learning networks and team-building processes. And this led to discussions on the role of an external facilitator. If she is not one of the “owners” of the experience, then what is her role? When must she get engaged in the process, and what responsibilities must she assume? These are issues which need to be dealt with before a process starts.

Finally, having different people involved has also shown the need to consider issues of power. Do all participants feel free to express their opinions? Do all opinions carry the same weight? A frequent observation made by participants was that differences are seen in the overall discussion and exchange of ideas when certain actors are present (e.g., an organisation’s director) as compared to when they are not.

**AND HOW TO GO ABOUT IT?** – The different documentation exercises in which we have been involved did not follow one method, but rather a set of basic methodological principles. We confirmed the importance of setting boundaries, describing a case, analysing it in detail, and sharing the main lessons learnt. Working in different settings helped us see the importance of not following a blueprint approach, but rather following these methodological principles. This flexible approach, however, did encounter regular difficulties, including the lack of time or specific resources, all of which called for clear and detailed plan.

More interestingly, the different cases have all shown the importance of giving greater attention to the analysis of the experience, starting with the correct identification of indicators and their use in measuring results and collecting opinions. Equally important is the need to pay attention to the final phase of a documentation process: the dissemination of the results and sharing the lessons learnt. Without a doubt, this is where all the cases have been weakest and where we want to place more attention during the coming months.

**FURTHER CHALLENGES** – Recognising that knowledge on agroecology is built in the field, ILEIA and the AgriCultures Network plan to continue supporting such processes. We plan to continue contributing to the dissemination of such knowledge, to its validation and to a growing acknowledgement of its importance. Our documentation programme is helping us fulfil our role. Further analysis of its results and a focus on institutional innovations and on policy and advocacy issues will help us sharpen it even more.

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# L'observatoire de la recherche agronomique en Algérie. Pour une intégration des pôles scientifiques dans le processus de développement

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**ABSTRACT:** Information management in organisations has given rise to areas whose complexity can be compared to that of cities. The coexistence of information spaces often fragmented and juxtaposed and the magnitude of changes of all types—from societal to technological—lead scientists to think about integration of information systems to meet multiple needs in a global vision. This paper describes an original experience aimed at designing an integrated information system for agricultural research in Algeria. The project is based on an open source web platform within the SIST (Scientific and Technical Information System) project, which was supported by French Ministry of Foreign and European Affairs. The Observatory of Algerian Agricultural Research pulls together the main sources of information and knowledge—publications, laboratories, researchers—in a unique web platform which can be viewed as an effort to build a collective intelligence. In so doing, the project also serves as a tool to drive change within organisations. The Observatory of Algerian Agricultural Research concept shows how designing a scientific information system can do more than simply meeting the need to display results. It can also become a decision support tool for research activities and serve as a public policy enabler, which allows for pooling resources and facilitating dissemination of results amongst various actors. Other outcomes that are expected from this project are new approaches of research scheduling.

**RESUMÉ:** La gestion de l'information dans les organisations a donné lieu à des secteurs dont la complexité peut être comparée à celle des villes. La coexistence d'espaces d'information, souvent fragmentés et juxtaposés, ainsi que l'importance de changements de toutes sortes—de social à technologique—ont conduits les scientifiques à penser à l'intégration des systèmes d'information pour répondre aux besoins multiples dans une vision globale. Cet article décrit une expérience originale dont l'objectif est de concevoir un système d'information intégré pour la recherche agronomique en Algérie. Ce projet est basé sur une plate-forme Web en open source qui se situe dans le programme SIST (Système d'information scientifique et technique) qui a été soutenu par le Ministère français des affaires étrangères et européennes. L'Observatoire de la recherche agronomique en Algérie rassemble les principales sources d'information et de

connaissance—publications, laboratoires, chercheurs—dans une plate-forme web unique qui peut être considérée comme une tentative pour établir une intelligence collective. Ce faisant, le projet sert également d'outil pour conduire le changement dans les organisations. Le concept d'Observatoire de la recherche agronomique en Algérie montre que concevoir un système d'information scientifique peut faire plus que simplement répondre à la nécessité de montrer des résultats. Il peut aussi devenir un outil d'aide à la décision pour les activités de recherche et de servir de catalyseur des politiques publiques, pour mettre en commun des ressources et de faciliter la diffusion des résultats auprès des différents acteurs. D'autres résultats attendus de ce projet sont de nouvelles approches pour la planification de la recherche.

**RESUMEN:** La gestión de la información a nivel organizacional ha originado áreas cuya complejidad puede compararse con la de las ciudades. La coexistencia de espacios de información a menudo fragmentados y yuxtapuestos y la magnitud de cambios de todo tipo—desde lo social hasta lo tecnológico—llevó a los científicos a pensar en la integración de los sistemas de información para satisfacer múltiples necesidades en una visión global. Este artículo describe una experiencia original, encaminada a diseñar un sistema de información integrado para la investigación agrícola en Argelia. El proyecto se basa en una plataforma Web de fuente abierta dentro del proyecto SIST (Sistema de Información Científica y Técnica), que fue patrocinado por el Ministerio de Asuntos Exteriores y Europeos de Francia. El Observatorio de Investigación Agrícola Argelino reúne las principales fuentes de información y conocimiento—publicaciones, laboratorios, investigadores—en una plataforma Web única que puede considerarse como un esfuerzo para establecer una inteligencia colectiva. Al hacerlo, el proyecto también sirve de herramienta para impulsar el cambio dentro de las organizaciones. El concepto del Observatorio de Investigación Agrícola Argelino muestra cómo el diseño de un sistema de información científica puede hacer más que simplemente satisfacer la necesidad de mostrar resultados. También puede convertirse en una herramienta de apoyo al proceso de toma de decisiones para las actividades de investigación y servir como un elemento facilitador de políticas del sector público, lo cual permite mancomunar recursos y facilitar la diseminación de resultados entre diversos actores. Otros resultados esperados de este proyecto incluyen nuevos enfoques hacia la programación de la investigación.

## Introduction

Le statut des sciences et des technologies dans la société s'est considérablement modifié au cours du XX<sup>e</sup> siècle, pour finir par acquérir une position de force dans la société. Aujourd'hui, la recherche scientifique n'a de sens qu'en étant liée à l'organisation de la société; ses ré-

sultats doivent servir à l'acquisition de nouvelles connaissances quand il s'agit de recherche fondamentale, mais également se présenter sous forme d'application pratique ou se traduire en innovation, pour permettre l'accroissement de la production. De ce point de vue, la recherche scientifique devient source de progrès pour nos sociétés. Elle irrigue l'innovation industrielle, l'activité

économique, le progrès social et la culture. Pour atteindre ce niveau de cohésion et de cohérence, entre ses différents niveaux d'activités, un pays doit asseoir sa stratégie de développement sur des outils offrant une vision intégrée de toutes ses composantes scientifiques et économiques. L'observatoire de la recherche agronomique en Algérie s'inscrit totalement dans cette logique de synergie entre la recherche et le développement ; sa conception s'est adossée sur une analyse du contexte global et spécifique de ce type de système d'information dont les enjeux ont été cernés dans une étude de faisabilité réalisée par l'Ecole Nationale Agronomique d'Alger, établissement porteur du projet, en partenariat avec le Cirad de Montpellier.

## 1. Les nouveaux enjeux des systèmes d'information

### 1.1. Des systèmes d'acteurs aux besoins hétérogènes

– Le traitement de l'information a donné naissance au fil du temps, à des dispositifs que l'on perçoit de plus en plus comme un ensemble de méthodes et d'outils qu'il faut stabiliser autour d'un système d'acteurs. Il est désormais admis que ce sont les stratégies des acteurs qui donnent sens aux outils et aux dispositifs d'information. Une des difficultés tient à la diversité de ces acteurs et à leur hétérogénéité face à des espaces informationnels où cohabitent une créativité personnelle et des efforts collectifs. Pendant longtemps, on s'est posé une question commune à l'ensemble des secteurs d'activité « Qui fait quoi et avec qui ? ». Aujourd'hui, les éléments en jeu sont très complexes, l'uniformisation des modes de traitement de l'information n'est plus possible face aux spécificités des situations. La difficulté est donc de faire correspondre les dispositifs d'information aux besoins hétérogènes et fluctuants de ceux qui en usent. Un des enjeux majeurs est d'accepter et de traiter ce rapport de force entre « une logique instrumentale et une logique d'intelligence » (Guyot B., 2006). Les représentations en matière de concepts et d'organisation de l'information restent également vagues et n'aident aucunement à identifier et à cerner les questions. A titre d'exemple, le processus de partage, à travers un système d'information, permet de sortir d'une vision partielle, pour accéder à un point de vue global. Mais, « le partage n'équivaut pas à un consensus » (Guyot B., 2006). Au-delà du décloisonnement qu'il favorise à travers les flux d'information, il vise aussi à créer les conditions pour rendre possible l'analyse croisée et produire de l'intelligence collective. De ce point de vue les systèmes d'information sont donc au coeur de profonds changements dans les rapports entre acteurs, qui se différencient de plus en plus par leurs objectifs.

**1.2. Produire de la valeur ajoutée** – On définit bien « la connaissance comme étant de l'information combinée avec l'expérience, le contexte, l'interprétation et la réflexion » (Reix R., 2004). Par conséquent, la gestion de la

connaissance s'affirme comme une réponse aux questions les plus délicates que se posent les acteurs des entreprises et qui consistent à savoir : comment exploiter collectivement les meilleures idées ? Comment capitaliser les acquis tout en restant vigilant sur les innovations des concurrents ? Comment transmettre les connaissances les plus stratégiques tout en les faisant évoluer ? (Bally J. F., 1999). Les systèmes d'information sont donc appelés à gérer ce que l'on appelle « le capital intellectuel » (OCDE, 2007), avec la mise en place de processus destinés à générer de la valeur à partir d'actifs intellectuels. Au coeur de l'activité économique, ils doivent répondre aux entreprises qui s'interrogent sur ce qu'elles savent et sur ce qu'elles ne savent pas. Dans le domaine de la recherche, l'information est à la fois matière première et produit fini des activités des chercheurs. Là aussi, les SI deviennent source de développement et de transfert d'innovations, vers les secteurs utilisateurs. Des préoccupations de valorisation de l'information produite par les dispositifs de recherche sont nées des espaces de diffusion, vecteurs de développement technologique et de formation.

**1.3. Urbanisation et intégration des systèmes d'information** – A l'instar d'une politique publique urbaine qui travaille sur le désenclavement pour créer une vie de cité cohérente, il se pose la problématique de l'intégration d'une multitude d'espaces d'information, souvent cloisonnés et juxtaposés. L'ampleur des changements en cours incite à réfléchir en termes d'enjeux et de stratégie d'intégration, dans une vision globale, d'intérêts et de besoins multiples. La technologie n'est pas une solution exclusive, elle doit être complémentaire d'un travail sur les mentalités et sur la conduite du changement. La démarche d'intégration est complexe car elle concerne de nombreux plans. Celui des types d'informations et des formats de description : textes, images, documents sonores, qu'il faut gérer ensemble. Celui des méthodes de travail : informatique, documentaire, éditorial et ergonomique qui doivent cohabiter dans un cadre commun. Celui de la répartition des responsabilités : unique ou partagée entre les responsables, distribuée entre les acteurs. Opter pour un dispositif totalement intégré signifie-t-il que les dispositifs antérieurs disparaissent totalement au profit d'un dispositif multi facettes qui assure à la fois stockage, exploitation, circulation et gestion des connaissances ? Ou faut-il penser autrement l'informatique, dans le cadre d'une réelle stratégie de gouvernance des technologies de l'information. Les besoins de créer de la valeur par l'assemblage de services est grandissant dans l'environnement concurrentiel actuel et les nouvelles architectures informatiques permettent la réutilisation d'une partie des anciens applicatifs connectés à d'autres plus récents, ou à ceux de partenaires, à l'intérieur d'un cadre cohérent et sans ruptures. On commence donc à prendre conscience que dans le cas d'une évolution de l'architecture silos vers l'architecture services, une demande d'évolution fonctionnelle consiste

à modifier une seule fois un composant bien identifié, limitant les coûts et les risques de régression. On parle donc de SI durable.

## 2. Les enjeux spécifiques à l'Algérie

L'économie algérienne est marquée par une forte dépendance alimentaire. La facture alimentaire constitue le second poste d'importations, après celui des biens d'équipements. Sur fond de crise mondiale qui entraîne de sérieuses perturbations du cours du pétrole, ressource principale du pays, cette situation est au cœur des préoccupations de tous les acteurs en rapport avec l'agriculture. Scientifiques et décideurs sont soucieux de mettre en place une stratégie de développement intégré favorisant les interactions entre recherche scientifique et développement; mais ils ne disposent pas de sources d'information conçues pour l'aide à la décision, au moment du montage des programmes de recherche. Ces outils leur sont indispensables pour répondre à différents niveaux de questionnements: quels sont les objectifs de développement économique et social du pays et quelle doit être la part de la recherche dans la réalisation de ces objectifs? Quelles sont les capacités et les ressources disponibles pour concrétiser ces objectifs? L'absence d'un système d'information spécifique à la recherche rend également impossible tout processus de valorisation de la recherche au profit du développement, ce qui nous amène à poser une multitude de questions dont les plus importantes sont les suivantes: comment capitaliser les résultats des scientifiques, pour les intégrer dans la dynamique de développement (gestion des actifs intellectuels)? Comment offrir aux décideurs et aux scientifiques des indicateurs d'évaluation indispensables dans toute politique d'adaptation de la recherche scientifique aux plans de développement (évaluer pour évoluer)? L'indispensable interaction chercheur/vulgarisateur/agriculteur fait également partie des préoccupations du secteur, tant elle est source d'intelligence collective. Elle permet à la recherche d'apporter des réponses aux besoins de l'agriculture et à la vulgarisation d'adapter ces solutions au contexte économique et socioculturel. La communication devenant ainsi un outil de socialisation et de fédération des initiatives. A l'heure actuelle, nous sommes encore loin de cette logique. Malgré son investissement sur un impressionnant dispositif de formation supérieure et de recherche, l'Algérie est confrontée à un manque crucial de visibilité de ses résultats de recherche et de ses travaux, en raison de la dispersion de sa mémoire nationale. La démultiplication de systèmes d'information institutionnels juxtaposés, rarement accessibles à distance, est un frein indéniable à tous les niveaux. En 2008, nous avons réalisé une enquête auprès d'une centaine d'enseignants chercheurs (Bensedira H., 2008), la proportion de 94% d'entre eux qui considèrent que l'accès à la production scientifique nationale est « difficile » est inquiétante; 29% estiment que cela est dû à la

défaillance du système national de recherche, et 28% au manque d'outils de recensement adéquats. Ce cloisonnement de la production scientifique retentit forcément sur le niveau de son exploitation et de son transfert: selon 33% des chercheurs, cette situation ne permet pas d'aborder la question du transfert de la recherche, seuls 4% estiment qu'il y a un processus de transfert vers le secteur agro-industriel privé. C'est dans ce contexte que l'Observatoire de la recherche agronomique en Algérie a été créé par quatre établissements fondateurs: l'Ecole Nationale Supérieure Agronomique, l'Ecole Nationale Vétérinaire, l'Institut National de la Recherche Agronomique, l'Institut des Sciences Marines et du Littoral; dans le cadre d'un projet triennal 2008/2010, de coopération algéro-français, associant le Cirad de Montpellier comme un partenaire privilégié.

## 3. Mise en place de l'observatoire de la recherche agronomique en Algérie

**3. 1. Objectifs de l'observatoire** – Cet observatoire doit essentiellement permettre de: 1. Rendre visibles et accessibles les résultats de la recherche agronomique algérienne; 2. Faciliter le transfert et la diffusion des résultats de recherche, leur appropriation et leur exploitation par les acteurs économiques concernés; 3. Offrir à l'Algérie un outil stratégique pour la définition, le pilotage et l'évaluation de ses activités de recherche agronomique; 4. Localiser facilement les compétences des experts algériens, et prendre connaissance de leurs activités, leurs projets et leurs publications; 5. Valoriser les compétences développées à travers une base de données de connaissances. Pour répondre à ces objectifs, il fallait donc construire un système d'information flexible et évolutif, en distinguant ce qui est le plus stable dans le système (le métier), du plus instable (l'organisation). Le recours à la modélisation sémantique et à la modélisation pragmatique permet cette distinction entre le métier et le fonctionnement, qui sont dilués dans l'approche traditionnelle des SI. Le modèle sémantique exprime les fondamentaux du métier, il adopte l'approche orientée objet. C'est à partir de celui-ci que les services les plus réutilisables et les plus largement partageables peuvent être identifiés. S'il est débarrassé de toutes les variations locales liées à l'organisation, il ne peut différer d'une entreprise à une autre à l'intérieur d'un même secteur d'activité. A partir de la signification garantie par le modèle sémantique, il devient possible de construire des composants standardisés. La modélisation sémantique sert l'objectif de mutualisation et se pose comme préalable à la mise à disposition de composants standardisés. Elle décuple les retombées des solutions génériques et de l'open source (Bonnet P. et al. 2008). La modélisation pragmatique introduit l'action de ces objets. Aujourd'hui, le véritable enjeu c'est d'obtenir une modélisation des processus qui stimule l'innovation organisationnelle (Bonnet P. et al. 2008). C'est pourquoi, il faut distinguer entre l'analyse et



la conception. Le terme conception s'est restreint à l'évocation de la conception du logiciel. Or, si nous revenons au sens courant de ces deux termes, analyser, c'est étudier un phénomène; concevoir, c'est inventer une solution. A ce niveau, on constate que la majorité des modélisations se contentent de décrire les pratiques existantes. L'approche classique souffre d'un risque qui consiste à reproduire les cloisonnements qu'elle trouve en place si le modélisateur tient pour acquis l'organisation en place et la distribution des rôles. L'innovation à ce stade exige la combinaison de plusieurs conditions: la volonté de l'organisme à rénover, la réceptivité des populations concernées, les compétences de l'organisateur et du modélisateur, la capacité à se distancier des pratiques en place. Elle couvre donc la sociologie des organisations et les théories du management. Par rapport à tout ce préalable, nous avons donc, grâce à l'appui des équipes du Cirad de Montpellier, réussi à concevoir un SI en prenant suffisamment de distance par rapport à tous les schémas existants et prévoir des fonctionnalités évolutives et adaptées aux besoins.

**3.2. Fonctionnalités de l'observatoire** – De sa phase de conception à celle de sa mise en oeuvre, ce projet s'est appuyé sur un partenariat traditionnel entre l'ENSA d'Alger et le Cirad de Montpellier, garant de la qualité de ses cahiers des charges et de la fiabilité de sa conception. C'est le résultat d'une co-construction et d'une vision partagée entre ces deux parties qui a permis de définir un outil adapté aux besoins et au contexte de l'Algérie, en utilisant une technologie intégrant des produits de l'open source. Sur cette base, l'outil devait répondre aux conditions suivantes: 1. Offrir aux établissements de recherche algériens un outil réutilisable, à installer de façon décentralisée, avec un portail d'agrégation; 2. Concevoir un système, évolutif, où l'administrateur peut paramétrer ou rajouter des valeurs, mais sans perturber la fonction d'agrégation; 3. Proposer un système générique, capable de s'adapter aux besoins et aux environnements des établissements, à condition de conserver le plus grand dénominateur commun de valeurs qui apparaisse au niveau de la fonction d'agrégation; 4. A court terme, implanter le dispositif à l'échelle d'un réseau d'établissements fondateurs, qui doit évoluer vers une dimension nationale. L'agrégation à un niveau national donnera lieu à des indicateurs de type stratégique, que l'on n'aura pas forcément à un niveau local.

**3.3. La production d'une offre innovante** – Composée de cinq bases de données qui fonctionnent de façon complètement relationnelle, l'observatoire de la recherche agronomique s'inscrit dans une logique d'offre totalement innovante et couvrant des besoins de niveaux différents.

**3.3.1. Un outil de gestion des bases de données de la recherche agronomique** – Ce volet du projet est au coeur du processus en place, car la maîtrise et la régularité de son alimentation vont en conditionner la réussite à un niveau micro et son extension à un niveau macro. Des

procédures d'alimentation sont donc clairement définies pour permettre la montée en charge initiale et la mise à jour permanente des bases de données par les membres de l'observatoire. Il faut toutefois souligner que ces procédures impliquent fortement les chercheurs, notamment dans la phase de mise à jour; elles doivent donc être soutenues par un travail permanent de sensibilisation et de communication sur l'intérêt et les retombées attendues de ce dispositif d'information dont ils sont à la fois les « pourvoyeurs » et les bénéficiaires.

**3.3.2. Un outil de diffusion de l'information sur la recherche agronomique** – L'Observatoire offre un moteur de recherche d'informations sur les différentes bases de données, interrogeables via la plateforme d'agrégation des données institutionnelles. Cette fonction est complétée par des produits d'informations sur support papier destinés à informer d'autres types d'utilisateurs et à alimenter d'autres espaces de travail qui se situent à des niveaux décisionnels scientifiques et/ou administratifs. Une des principales contraintes levées par ce projet est la saisie sans cesse répétée que nous faisons pour produire des répertoires de laboratoires, de projets ou de publications. Désormais, ce nouveau système permet le paramétrage de données pour l'édition de produits adaptés aux besoins et aux contextes conjoncturels. On sait que dans des situations de crise (sanitaire par exemple) ou de débats sur des questions économiques stratégiques, les décideurs sont toujours demandeurs de listes de chercheurs pour identifier et localiser les compétences mobilisables.

**3.3.3. Un outil de gestion de la recherche** – La pérennité des cinq bases de données est désormais intégrée dans le processus même de gestion de la recherche au plan institutionnel. Dans l'organigramme des flux de l'information spécifique aux laboratoires ou projets de recherche, ainsi que dans les procédures de validation administrative qui régissent la vie d'un laboratoire ou d'un projet de sa naissance à son achèvement, l'alimentation de ces bases de données est un passage obligé. Ces bases de données sont l'expression même de la dynamique du laboratoire ou du projet: mobilité des chercheurs ou des institutions partenaires nationales ou étrangères, changement du nom du responsable du projet, nouvelles publications, date de fin du projet... On est véritablement dans une logique de gestion et de suivi des activités de recherche. En raison de la sensibilité de ces informations, les droits des utilisateurs sont clairement définis: alors que le large public a accès aux informations d'ordre général, les chercheurs peuvent accéder aux mises à jour automatique de leur curriculum vitae, et les directeurs de laboratoires aux fonctionnalités spécifiques à la gestion des rapports de synthèse semestriels de recherche.

**3.3.4. Pilotage de la recherche** – Attentive aux contenus scientifiques et techniques, aux résultats obtenus, aux liens qui se nouent entre les acteurs, l'évaluation de la recherche va au-delà de l'approche diagnostic. De plus en plus, décideurs et scientifiques s'interrogent sur la

pertinence de leurs travaux et cherchent à traduire les objectifs de développement en objectifs et en priorités de recherche; ce type de vision n'est possible que si le SI intègre la fonction de production d'indicateurs de restitution. La valeur ajoutée de la fonction d'agrégation de l'Observatoire se mesure donc à sa capacité à produire des indicateurs d'évaluation de la recherche scientifique. Très utiles au suivi des activités scientifiques, ces indicateurs sont surtout indispensables, à un niveau stratégique, pour la planification de la recherche en fonction des besoins du développement, en produisant une cartographie très fiable de la recherche agronomique. Même si ces indicateurs varient en fonction des besoins, des catégories d'acteurs (chefs d'établissements, chefs de laboratoires, directions centrales des ministères...), on peut envisager de mesurer à titre d'exemple: le niveau de couverture des priorités économiques nationales par la recherche; la répartition des chercheurs par spécialités et identifier par voie de conséquence les domaines de compétences à consolider. Pour la production de ces indicateurs, la notion de «système générique et évolutif» retenue est essentielle; les besoins réels de mesure des activités de recherche vont s'exprimer au fur et à mesure de la socialisation et de l'appropriation du projet et de ses fonctionnalités.

## Conclusion

Dans un monde fortement marqué par la mondialisation et la compétitivité, la recherche scientifique, application délibérée et organisée du travail humain à la production de connaissances (Jourdan L., 1995), est désormais indissociable du développement économique et social; on estime que dans les vingt prochaines années, 60% des augmentations nécessaires de l'alimentation et de la production agricole devront parvenir de l'accroissement des rendements et que sans la recherche cet objectif est utopique. L'observatoire de la recherche agronomique algérienne, conçu dans le cadre d'un projet de coopération algéro-français, s'insère de façon stratégique dans le processus de développement national. Outil de pilotage et de gestion de la recherche, il va en assurer autant la valorisation que la planification en fonction des besoins du développement. Pour les acteurs de ce secteur, il s'affirme comme un cadre de mutualisation et de fertilisation croisée, très attendu. A moyen et long terme, son implantation dans plus d'une centaine d'établissements spécialisés va doter l'Algérie d'un système d'information intégré qui va aider à conduire une véritable culture du changement, en intégrant le «pétrole gris», produit de la recherche, comme source d'innovation dans le développement.

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# Knowledge Sharing on Best Practices for Managing Crop Genebanks

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**ABSTRACT:** The Crop Genebank Knowledge Base (CGKB) is an initiative of the Consultative Group of International Agriculture Research (CGIAR) System-wide Genetic Resources Programme (SGRP). The CGKB was created for sharing knowledge about best practices for managing plant genetic resources (PGR), and making effective decisions about genebank management. Genebank practices from CGIAR Centers and national genebanks were gathered for nine crops (banana, barley, cassava, chickpea, forage grasses and legumes, maize, rice and wheat). This information will help PGR professionals to participate in a global crop conservation effort. An interactive approach with many partners and stakeholders was used to gather published and unpublished information about genebank management. Information on crop-specific best practices was initially collected from crop experts using pre-defined forms. In parallel, a web portal was developed using the open-source content management system (CMS) Joomla!. The CMS allows several editors to maintain pages and update them. Other participatory tools such as wiki pages, a blog, a discussion forum and online forms have been set up to gather future contributions, including information on other crops. The site provides a one-stop platform for information on conservation, characterization, regeneration and safety duplication of each of the nine crops. It also provides information on general (non-crop-specific) genebank management procedures, as well as a comprehensive bibliography of online publications, a glossary, links to relevant external websites, video and photo materials, and training modules. This paper discusses a process of collective action to develop a multi-institutional web platform, highlights important criteria for success, challenges and major lessons learned, and proposes options for the way forward.

**RESUMÉ:** La Base de connaissances sur les banques de gènes des cultures (CGKB) est une initiative du Programme mondial sur ressources génétiques (SGRP) du Groupe consultatif pour la recherche agricole internationale (CGIAR). Le CGKB a été créé pour partager les connaissances sur les meilleures pratiques pour la gestion des ressources phylogénétiques (RPG) et prendre des décisions efficaces sur la gestion des banques de gènes. Les pratiques des banques de gènes des centres du CGIAR et des banques de gènes nationales ont été recueillies pour neuf cultures (banane, blé, légumineuses et graminées fourragères, maïs, manioc, orge, pois chiche et riz). Cette information aidera les professionnels des RPG à participer à un effort mondial de conservation des cultures. Une approche interactive avec de nombreux partenaires et parties prenantes a permis de recueillir l'information publiée et inédite sur la gestion des banques de gènes. L'information sur les meilleures pratiques concernant

chaque culture a été initialement collectée par des experts de ces cultures en utilisant des formulaires prédéfinis. Parallèlement, un portail Web a été développé avec le système de gestion de contenu open source (CMS) Joomla!. Le CMS permet aux éditeurs de maintenir des pages et les mettre à jour. D'autres outils participatifs tels que les pages wiki, un blog, un forum de discussion et des formulaires en ligne ont été mis en place pour recueillir les futures contributions, y compris des informations sur d'autres cultures. Le site propose une plate-forme unique pour accéder à l'information sur la conservation, la caractérisation, la régénération et la duplication sans risque de chacune des neuf cultures. Il fournit également des informations sur des procédures générales (non spécifique à la culture) de gestion des banques de gènes, ainsi qu'une bibliographie exhaustive des publications en ligne, un glossaire, des liens vers des sites web utiles, des vidéos et des photos ainsi que des modules de formation. Cet article traite d'un processus d'action collective pour développer une plate-forme web multi-institutionnelle, met en lumière des critères importants pour son succès, les défis et les principales leçons apprises et propose des options pour l'avenir.

**RESUMEN:** La Base de Conocimientos sobre Bancos de Genes de Cultivos (CGKB) es una iniciativa del Programa de Recursos Genéticos (SGRP) del Grupo Consultivo para la Investigación Agrícola Internacional (CGIAR). Se creó el CGKB para compartir conocimientos acerca de las mejores prácticas para manejar los recursos fitogenéticos (RFG), y tomar decisiones eficaces acerca del manejo de bancos de genes. Se recopiló las prácticas de los bancos de genes de los Centros del CGIAR y los bancos de genes nacionales para nueve cultivos (banano, cebada, yuca, garbanzo, gramíneas y leguminosas forrajeras, maíz, arroz y trigo). Esta información ayudará a profesionales en RFG a participar en una iniciativa global de conservación de cultivos. Se utilizó un enfoque interactivo con muchos socios e interesados directos para recopilar información publicada e inédita acerca del manejo de bancos de genes. Inicialmente se recopiló información sobre las mejores prácticas específicas a diferentes cultivos de expertos en los anteriores cultivos utilizando formatos predefinidos. De igual modo, se desarrolló un portal en la Web utilizando el sistema de manejo de contenido de fuente abierto (CMS) de Joomla!. El CMS permite a varios editores hacer mantenimiento de las páginas y actualizarlas. Se han instalado otras herramientas participativas como las páginas wiki, un blog, un foro de discusión y formatos en línea para recolectar contribuciones futuras, incluyendo información sobre otros cultivos. El sitio provee una plataforma integrada para información sobre conservación, caracterización, regeneración y duplicados de seguridad para cada uno de los nueve cultivos. También proporciona información sobre los procedimientos generales de manejo de bancos de genes (que no son específicos a un cultivo en particular), así como una bibliografía comprehensiva de publicaciones en línea, un glosario, enlaces a sitios

Web externos que son pertinentes, videos y material fotográfico, y módulos de capacitación. Este artículo trata un proceso de acción colectiva para desarrollar una plataforma Web multi-insti-

tucional, destaca criterios importantes para tener éxito, indica los principales retos y las lecciones aprendidas, y propone opciones para el camino por adelante.

## Introduction

**Crop genetic diversity** is used as a major resource by plant breeders and farmers to meet food production challenges for the growing number of poor and hungry people in changing environments. Genebanks were first established over 50 years ago to conserve threatened crop diversity in local land races that were being displaced by new improved varieties and destruction of natural habitats. New technologies and better practices have been introduced for more effective and efficient conservation of plant genetic resources in genebanks; in parallel, information technology has advanced allowing more efficient documentation and sharing of information.

Genebank management guidelines for different crops are scanty and hard to find; most are generic (Engels and Visser, 2003; Reed et al., 2004; Rao et al., 2006) and scattered in the literature. Many procedures are inaccessible in the public domain because they only existed as institutional manuals or guidelines. Earlier approaches focused on identifying rigid standards that curators were expected to follow in all genebanks (FAO/IPGRI, 1994). A new approach was required to collate individual crop best practices for germplasm management. The objective of this project is to make those best practices accessible to collection holders, with the desired outcome of conserving the genetic integrity and viability of crop germplasm.

The use of searchable web-based tools to exchange information, experiences, approaches and best practices is replacing traditional indexed publications such as encyclopedias and dictionaries. The development of technical knowledge bases requires quality content, content management systems and web development to address issues of design and usability that meet the needs of the target audiences (December, 1996). Conventionally accepted principles of knowledge organization and representation for learning tools are being combined with integrated semantic tools to develop models in concept-based digital learning environments, such as searchable databases, browsers, search engines, wikis, blogs, ontology and visualization (Bergman, 2007), and software (Smith et al., 2004).

Knowledge bases have been developed in several thematic areas in recent years. Those related to agriculture and development include the Global Knowledge Center on Crop Biotechnology (<http://www.isaaa.org/kc/default.asp>), the Food Security and Agricultural Production Knowledge Forum ([http://www.fao.org/corp/knowledge\\_forum/en/](http://www.fao.org/corp/knowledge_forum/en/)), the International Fund for Agricultural Development (IFAD) Rural Poverty Portal (<http://www.ruralpovertyportal.org/web/guest/home>), the Pro-poor Live-

stock Development Knowledge Base ([http://www.cop-pld.net/cop\\_knowledge\\_base/](http://www.cop-pld.net/cop_knowledge_base/)), the World Bank Institute for poverty reduction and development (<http://wbi.worldbank.org/wbi/>), the Cereal Knowledge Bank on rice, maize and wheat (<http://www.knowledgebank.irri.org/>) and the Global Plant Clinic on diseases of tropical crops ([http://www.globalplantclinic.org/Html/About\\_Us.htm](http://www.globalplantclinic.org/Html/About_Us.htm)). Despite the number of crop-related knowledge bases however, none focus specifically on crop genetic resources.

The Crop Genebank Knowledge Base (CGKB) was developed to fill this gap. It provides dynamic, up-to-date information on peer-reviewed best practices for germplasm management of a number of major crops and genebank procedures (registration to distribution), protocols, guidelines, manuals, publications, training materials and other aspects of genebank management to support more efficient and effective conservation. The website is a balance of technical and practical genebank knowledge channeled through information technologies that facilitate knowledge sharing. The website uses the most current, appropriate web tools, communication platforms and interactive multimedia. The primary objectives of the CGKB are to:

- Provide user-friendly online access to procedures, standards and practices for managing clonally propagated and seed crops held in genebanks;
- Compile and adapt best practices in a learning platform;
- Provide a mechanism to update and develop new best practices for the management of a range of crops— This platform will allow for improvement of best practices in the future as well as provide a baseline for monitoring change;
- Strengthen capacity of genebank curators and technicians to manage genebanks, including new staff;
- Ensure the quality of genetic resources distributed from genebanks; and
- Provide links to other related information and training resources;

## Approach in developing the Crop Genebank Knowledge Base website

CGKB was an initiative of the Consultative Group on International Agriculture Research (CGIAR) System-wide Genetic Resources Programme (SGRP). It was developed as part of a three-year project on collective action for crop genetic resources, focusing on the nine crops conserved and managed in the genebanks of international agricultural research centres (IARCs).

**Partnerships** – A participatory approach involving

crop experts from IARCs and national genebanks worldwide was implemented to collate and develop crop-specific best practices and associated information concerning genebank management. This information was compiled by training and communication experts, project collaborators and selected users, who co-developed the best practices and undertook technical and editorial reviews.

**Website structure** – Four major themes (crops, procedures, management strategies and learning resources) were chosen as an organizing structure for the core content of the website. The names, content and layout for these menus were fine-tuned during website development and adjusted as necessary to incorporate useful and practical features observed in similar websites. Sub-menus were identified for each main menu, harmonizing general genebank procedures with those for seeds and clonally propagated crops.

The structure was designed to have a simple and logical flow of content, with no more than three clicks to reach any page (Web Transitions, 2003). Navigation options were established, linking related pages across the site. Relevant content was repeated, for example, links were provided to visual aids for specific procedures, tables, files or references, where appropriate, to facilitate access to and enrich information. From the beginning, the CGKB website structure and layout were developed with the involvement of genebank experts; design and navigation features were fine-tuned based on feedback from user questionnaires. The training component of the website was validated through its successful use in a genebank training course co-organized by Bioversity International and the Rural Development Administration in Suwon, Republic of Korea (7–18 September 2009).

**Tools** – The CGKB was developed using an open-source (General Public License) content management system (CMS), Joomla! (<http://www.joomla.org/>), which does not require expensive licenses and can be used by different contributors. CMS software keeps track of every file (text, photos, videos and documents) on a site, thus making the overall management easy to oversee. A major advantage of using a CMS is that it allows different editors in multiple locations to manage content.

A separate platform linked to the CGKB was built using the wiki software Wikispaces (<http://www.wikispaces.com/>) to provide a space where contributors can post, edit and discuss possible content for the CGKB. A discussion forum and online form for uploading best practices were provided to gather contributions. The CGKB was enriched with multimedia products to illustrate content such as images, flipbooks, video clips and a photo database (<http://www.flickr.com/photos/croptgenebank/collections/>) using Flickr (<http://www.flickr.com/>). Website traffic is monitored and recorded using Google analytics (<http://www.google.com/analytics/>). A blog was established using WordPress to facilitate informal communication among collaborators and users, and to pro-

vide current information about the project and related activities.

**Content** – Practical information on best practices for managing plant genetic resources (PGR) was primarily provided by experts from IARC genebanks and partners using pre-designed templates. Information was edited and uploaded into the website. Information gaps were captured by the editors from literature reviews and appropriate websites. Experts regularly reviewed material uploaded onto the web portal and provided feedback, thereby ensuring that the information was correct, precise and up to date. A peer review was also carried out at the end of the project by external genetic resources experts.

A list of references was compiled for each web page with hyperlinks to the full text where available in the public domain. Key contributors were listed for each webpage and a focal point was identified to keep each page regularly updated and to respond to queries. Copyright issues for the various types of information (text, links, visual aids, publications) displayed on the website follow the policies of each collaborating institution.

## Results

**Features of the CGKB** – The Crop Genebank Knowledge Base is now publicly available at <http://croptgenebank.sgrp.cgiar.org> and results of this project are summarized below:

**Home** – The Home section (Figure 1) provides general information about the website, how it was created, how it is expected to be updated and its main features. It includes the copyright policies of collaborating institutes and an editor login. It also provides information about contributors and sources of information. This page incorporates interactive communication features such as a forum and a blog, inviting users to interact and collaborate, register comments, pose queries or upload their own best practices. Users can also find the latest news from RSS feeds on genebank management and related topics. Wikis provide users with work spaces to update existing practices or develop new ones in a collaborative way. These tools contribute to dynamic learning and help to create networks and strengthen links with other organizations and individuals; according to Horton et al. (2003), this is becoming increasingly important in managing modern organizations.

**Crops** – The Crop section is the heart of the website and is particularly important for genebank managers because it provides crop-specific information, references and options on recommended procedures. This section describes best practices for germplasm management in genebanks for specific crops. Information is currently available for banana, barley, cassava, chickpea, forage grasses and legumes, maize, rice and wheat, together with additional information on regeneration guidelines for other major crops—the output of a related

project sponsored by the Global Crop Diversity Trust (Figure 1).

Each crop section starts with a general introduction about the importance and origin of the crop, available types and utilization, and information on how the best practices were compiled. Users can then access the detailed pages about conservation, characterization, regeneration and safety duplication practices. These pages have a similar structure within crops, making it easy to find and add information for new crops. Small-format variations were needed for clonal and seed crops, related to the conservation methods used.

**Procedures** – This section provides the reader information about general (not crop-specific) genebank procedures in an interactive manner. All procedures from registration to distribution, which were mainly derived from the *Handbooks for Genebanks* published by Bioversity International (Rao et al., 2006; Reed et al., 2004; Engels and Visser, 2003) are described. Each menu presents a procedure and explains why, when and how it should be followed. The relative advantages and disadvantages of different kinds of genebanks (seed banks, field banks, *in vitro* banks, cryobanks, vegetative banks and DNA banks) are discussed under the conservation subsection. A compilation of genebank equipment, supplies and main suppliers is also provided. This section was specially designed to help newcomers to access information and learn about genebank management procedures. The procedures found here can also be used by lecturers as handouts for training workshops and courses on genebank management or *ex situ* conservation.

**Management strategies** – This section covers genebank best practices on management issues such as risk and quality management using the following menus: genetic identity, quality management, safety duplication strategies, safe movement of germplasm, policies, risk management, inventory system, decision-support tool and performance indicators. This section is particularly useful for those looking for user-friendly support tools related to cost decisions and risk assessment, or broader guidance on genebank management strategies.

**Learning resources** – The Learning resources space provides a comprehensive electronic library relevant to teaching and learning about genebanks. This section

FIGURE 1 – Home page of the Crop Genebank Knowledge Base showing menus and links



aims to build the capacity of genebank curators and technicians. Its content differs from other sections of the CGKB: it is primarily a repository of publications and other learning resources on genebanks. This section adds considerable value to the CGKB. For the first time, it gives teachers and learners access to a one-stop genebank management library comprising training modules, handbooks and manuals, most of which are available full-text in pdf or html formats. It also provides an extensive bibliography on genebanks and genetic resources cited throughout the CGKB website. The learning resources section provides access to a collection of audio/visual learning resources including videos and slide shows, workshop presentations, and a photo database that is built within a social networking medium (Flickr). Finally, the section includes an extensive glossary and acronym list, and a list of useful links to other websites with information about genebanks or genebank management.

**Challenges in CGKB development** – The process of developing the CGKB as a multi-partner, multi-crop,



multi-location and multi-disciplinary project was complex. There were many lessons learned that can benefit others.

**Partnerships** – The large number of collaborators from various disciplines provided a broad range of expertise and rich content. However, the interdependent steps and multiple feedback loops involved in writing, uploading and reviewing the content authored by many resulted in high transaction costs and delays in completing the project in the required time frame. Contributions varied greatly-contributors did not always follow the proposed template and the depth of information, details of references and visual aids varied widely across contributors. Face-to-face meetings, workshops, surveys, questionnaires and personal visits by the project coordinator were extremely helpful to create awareness about the CGKB project and prompt contributions, as well as to collect visual materials to support and enrich the content provided.

**Virtual collaboration with remote partners and team members** – Discussing the site design by email with people across the globe was difficult and complex. It took some time for the editing group to achieve a common language. Communication through Skype and telephone during critical discussions of structure and design was helpful. Face-to-face meetings with important collaborators also helped to resolve problems or make difficult decisions.

**Tools and training** – The editors had to learn to use the IT tools (Joomla!) to edit and change web pages. Training tutorials were developed to facilitate distance learning for current and future editors and collaborators. Editorial rights were maintained within a restricted group of the CGKB team. Most collaborators were unfamiliar with web tools such as wikis, blogs or Google shared documents, and these were not used as extensively and effectively as anticipated. Wikispaces were used for a few activities to generate discussion on best practices; however they did not contribute to the majority of information gathered and were only effective with one group of contributors who had a specific, time-bound objective. In the near future, a facilitated wiki-space discussion will be organized to update best practices on plant exploration and collecting procedures that were originally published 15 years ago.

**Content** – Word Templates were initially prepared to collect information from contributors in a structured manner, similar to the website layout. These were useful but needed adjustment when information was uploaded. It was also challenging to convert text-based information into a meaningful and logical digital structure for access on the Internet. Reviewing the uniformity and layout of each web page was extremely time consuming and difficult until all pages were finalized.

**Future opportunities** – One major challenge for the CGKB was to develop a product that remains up to date, flexible and useful over time, particularly as regular up-

dating is critical to provide reliable knowledge on best practices and risk-management procedures. The CGKB was developed by a community of practice that should remain active for many years to come. Mechanisms to fund minimal maintenance of the site were established with SGRP, assuring the basic support and updating in the future. The system of assigning focal points for each best practice page should also guarantee that content is updated in the future. This website provides a platform to include new crops or translations into other languages, and information on new and emerging technologies.

This platform is already being used as a training tool for genebanks, such as in courses targeting genebank curators co-organized by Bioversity and the International Center for Agricultural Research in the Dry Areas (ICARDA) in Amman, Qatar and Aleppo in early 2010. Whether used for self-learning or formal training, the features found on the CGKB will contribute to narrowing knowledge gaps, help to create communities of genebank practitioners and strengthen their capacity to be effective custodians of the world's crop diversity for food and agriculture in the future.

## Conclusions

This paper describes the process of developing a one-stop platform for best practices on crop genebank management and procedures. Synergies were created by many experts who gathered and transformed scattered information into knowledge that will improve the efficiency of conserving seeds and vegetative plant materials, making them available for future generations.

The CGKB is now a valuable interactive platform that can be used and expanded in new directions. Current crops and genebank information will be regularly updated. The crop focal points and their networks now have the responsibility of updating the knowledge and encouraging peers to provide feedback and new content to continue to expand and improve this tool. Channels of communication and collaboration have been established and will be easy to use in the future. This is an open invitation for the global genebank community to participate and provide feedback and new information on genebank issues and best practices for other crops.

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contributed significantly to improving the content, layout and navigation of this website. The list is too long to be included here, but is available on the Contributors page of the CGKB website ([http://cropgenebank.sgrp.cgiar.org/index.php?option=com\\_content&view=article&id=111&Itemid=211](http://cropgenebank.sgrp.cgiar.org/index.php?option=com_content&view=article&id=111&Itemid=211)). The authors wish to thank Patrizia Tazza for contributions to the design and banner of the website.

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# Communicating Agricultural Science and Technology Indicators: Lessons Learned

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**EDITOR'S NOTE:** Paper presented at the IAALD XIIIth World Congress, Scientific and Technical Information and Rural Development, Montpellier, 26–29 April 2010.

**ABSTRACT:** This paper discusses the strategy of the Agricultural Science and Technology Indicators (ASTI) initiative toward communicating agricultural S&T information and trends at global, regional, and national levels. To understand the contribution of agricultural S&T to agricultural growth, quantitative information is fundamental. Indicators derived from such information allow the performance, inputs, and outcomes of agricultural S&T systems to be measured, monitored, and benchmarked. These indicators assist S&T stakeholders in formulating policy, setting priorities, and undertaking strategic planning, monitoring, and evaluation. One of the few sources of information on agricultural S&T statistics in low and middle income countries is the Agricultural Science and Technology Indicators (ASTI) initiative. Since 2001, ASTI has been active in compiling, analyzing, and publicizing data on institutional developments, investments, and capacity trends in agricultural S&T in low-and middle income countries worldwide. ASTI is generally recognized as the most authoritative source of information on the structure, financing, and capacity of agricultural S&T worldwide, and its outputs have been widely cited in international agricultural research policy documents. Based on lessons learned since the inception of the ASTI initiative, a number of approaches have been developed to enhance the dissemination and usage of ASTI outputs, including the formation of strong partnerships, the tailoring of information to different stakeholders, and the creation of an interactive data tool on the ASTI website.

**RESUMÉ:** Cet article discute de la stratégie des Indicateurs relatifs aux Sciences et Technologies Agricoles (ASTI) pour communiquer l'information agricole scientifique et techniques (S&T) ainsi que des tendances au niveau mondial, régional et national. Pour comprendre la contribution des S&T agricoles à la croissance agricole, les informations quantitatives sont fondamentales. Les indicateurs dérivés d'une telle information permettent l'exécution, les entrées et les résultats des informations S & T agricoles destinées à être mesurées, surveillées et évaluées. Ces indicateurs aident les intervenants en S&T à formuler des politiques, établir des priorités et entreprendre la planification stratégique, le suivi et l'évaluation. L'ASTI est une des rares sources d'information en statistiques S & T sur les produits

agricoles dans les pays à revenus faibles et intermédiaires. Depuis 2001, l'ASTI a été actif dans la collecte, l'analyse et la publication des données sur l'évolution institutionnelle, les investissements et l'évolution des capacités en S & T agricoles, dans le monde entier, pour les pays à revenus faibles ou intermédiaires. L'ASTI est généralement reconnu comme la source d'information qui fait autorité sur les structures, les finances et les capacités des S & T agricoles dans le monde entier; ses résultats ont été largement cités dans les documents internationaux de politique de recherche agronomique. Sur la base des leçons apprises depuis le début de l'initiative ASTI, un certain nombre d'approches ont été développées pour améliorer la diffusion et l'utilisation des données de l'ASTI; elles comprennent la formation de partenariats solides, l'adaptation de l'information aux différentes parties prenantes et la création d'instruments de données interactifs sur le site Internet de l'ASTI.

**RESUMEN:** Este artículo trata la estrategia de la iniciativa Indicadores de Ciencia y Tecnología Agrícola (ASTI, su sigla en inglés) para comunicar información y tendencias de ciencia y tecnología (C&T) agrícola a nivel mundial, regional y nacional. La información cuantitativa es fundamental para comprender la contribución de la C&T agrícola al crecimiento agrícola. Los indicadores derivados de tal información permiten medir, hacer seguimiento y comparar con la competencia el desempeño, los insumos y los productos de los sistemas de C&T agrícola. Estos indicadores ayudan a los interesados directos en C&T a formular políticas, establecer prioridades y abordar la planificación, el seguimiento y la evaluación de manera estratégica. La iniciativa ASTI es una de las pocas fuentes de información sobre estadísticas de C&T agrícola en países de bajos y medianos ingresos. Desde el año 2001, la ASTI ha sido activa en compilar, analizar y divulgar datos sobre desarrollos institucionales, inversiones y tendencias de capacidad en C&T agrícola en los países de bajos y medianos ingresos a nivel mundial. La ASTI es reconocida, en general, como la fuente de información más fehaciente sobre estructura, financiamiento y capacidad de C&T agrícola en todo el mundo, y sus resultados han sido ampliamente citados en documentos de políticas de investigación agrícola internacional. Con base en las lecciones aprendidas desde el inicio de la iniciativa ASTI, se han desarrollado varios enfoques para mejorar la difusión y el uso de los productos de ASTI, incluyendo la formación de alianzas sólidas, la adaptación de información a diferentes interesados directos y la creación de una herramienta interactiva de datos en el sitio Web de ASTI.

## Introduction

**One of the few sources of information** on agricultural science and technology (S&T) statistics in low-and middle-income countries is the Agricultural Science and Technology Indicators (ASTI) initiative. Since 2001, ASTI, facilitated by the International Food Policy Research Institute (IFPRI) has been active in compiling,

analyzing, and publicizing data on institutional developments, investments, and capacity trends in agricultural S&T in low-and middle income countries worldwide. ASTI has published sets of country briefs and regional synthesis reports that have been widely and frequently cited in both national and international agricultural research policy documents. ASTI outputs describe trends (progress of human and financial capacity in agricultural

research over time) and comparative information (performance of a country or region compared to others). The initiative entails a large amount of original and ongoing survey work focused on developing countries, but also maintains access to relevant data for developed countries. In addition to providing statistics, ASTI is also a comprehensive source of qualitative information relating to the history of national agricultural R&D systems, changes in institutional setups, and constraints faced by agencies and researchers in undertaking agricultural R&D. Data collection, analysis, and dissemination are conducted through a network of national, regional, and international agricultural R&D agencies.

Based on lessons learned since the inception of the ASTI initiative, a number of approaches have been developed to enhance the dissemination and usage of ASTI outputs, including the formation of strong partnerships, the tailoring of information to different stakeholders, and the creation of an interactive data tool on the ASTI website. This paper will discuss ASTI's strategy toward communicating agricultural S&T information and trends at global, regional, and national levels.

## ASTI Data in the Context of Agricultural S&T Policy

In recent years, there has been increased emphasis on the critical role of S&T in promoting economic growth, food security and poverty alleviation in the developing world, particularly in the field of agriculture. Well-funded and staffed agricultural research systems and new and better-targeted technologies are important prerequisites for successful innovations in agriculture. Unfortunately, investments in agricultural research and development (R&D) in many developing countries have stagnated over time, despite the fact that numerous studies have repeatedly linked agricultural productivity improvements with increased investments in agricultural R&D. Moreover, agricultural R&D systems in many countries have become increasingly complex with new organizational structures to manage and allocate public funding, increased participation of the higher-education and private sectors, and diversification in funding sources. Finally, there has been an increasing diversity in the structure, investment trends, and functioning of agricultural R&D systems across countries and regions (Pardey et al., 2006).

Data on the size, scope and institutional changes of agricultural research agencies informs understanding of the contribution of agricultural S&T in promoting agricultural growth. Indicators based on such quantitative information assist in measuring, monitoring, and benchmarking the performance, inputs, and outcomes of agricultural S&T systems (Spielman and Birner, 2008). Institutional capacity and methods of collecting national S&T indicators have been developed by industrialized countries in the past few decades, mostly as a result of

the advocacy efforts by the Organisation for Economic Co-operation and Development (OECD) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). However, national S&T indicators, agriculturally related indicators in particular, are still scarce in developing countries, except for some Latin American and Asian countries that have developed their own national S&T indicator capacity and databases. South Africa is the only country in Sub-Saharan Africa that produces national S&T indicators, although the New Partnership for Africa's Development (NEPAD) has recently initiated the African Science, Technology and Innovation Indicators Initiative (ASTII) program aimed to build capacity to develop African S&T indicators. Although these national S&T indicators include the agricultural sector, no suitable provisions are available to extract a full set of agricultural S&T indicators that encompass all activities in the agricultural sector.

ASTI fulfils a unique role in providing the information needed for understanding the current status and direction of national agricultural research systems in developing countries. In a framework of policy change, these types of information provide a foundation for developing policy options (Traxler, 2008). However, data and statistics need to be developed as part of a system that ensures accessibility of the information as well as the capacity to collect and use the data. In the policy cycle, policy analysis takes that information a step further by advancing understanding of and weighing of policy options. Data and policy analysis can provide the basis for advocacy of these policy options (see also Tijssen and Hollanders, 2006; NEPAD, 2007). At this stage, communication is most important to strengthen the links between networks of policy researchers and policymakers. Data, statistics, and analysis can also inform the policy implementation and monitoring and evaluation stages of the policy change cycle by providing a baseline with which to measure performance. The final outcomes and evaluation of the policy change then inform the next round of priority-setting, which can influence the development of future data collection and policy analysis.

## Communicating ASTI

ASTI information is provided at the global, regional, and national levels, meaning that it can be applied to a wide range of agricultural policy issues and is used by a diverse set of stakeholders. Communication of such information can therefore be a challenge. After almost a decade of operation, a number of insights have been gained into how to communicate ASTI information more clearly and reach a wider audience. In the following sections, we review the main components of ASTI's communication strategy and experiences in implementing communication activities.

**What to communicate?** – The ASTI datasets and reports feature a wide range of indicators and time-series

data across countries, regions, and at the global level, including:

- Levels and trends in agricultural research investments
- Levels and trends in agricultural research capacity
- Developments in the institutional arrangements surrounding agricultural research
- Agricultural R&D funding levels and donors
- Degree levels of agricultural research capacity
- Proportion and degree levels of women participating in agricultural research
- Proportion of research capacity allocated to crop, live-stock, and other agricultural areas

**Target Groups** – ASTI has a large set of stakeholders at the national, regional, and international level including:

- National agricultural research agencies and policy-makers in developing countries
- Regional and sub-regional agricultural research organizations such as the Asia Pacific Association of Agricultural Research Institutions (APAARI), the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), West and Central African Council for Agricultural Research and Development (CORAF/WECARD), the Forum for Agricultural Research in Africa (FARA), and the Forum for the Americas on Agricultural Research and Technology Development (FORAGRO)
- Multilateral organizations such as the World Bank, InterAmerican Development Bank, the African Development Bank, the Asia Development Bank, OECD, UNESCO, Food and Agriculture Organization, and other UN organizations
- Donor organizations involved in funding agricultural R&D in developing countries
- International agricultural research consortiums and forums such as the Consultative Group on International Agricultural Research (CGIAR), including its 15 International Agricultural Research Centers, and the Global Forum on Agricultural Research (GFAR)

Since its inception, ASTI's audience has not changed significantly. Some users draw on only a portion of ASTI's outputs (e.g. specific gender data or R&D spending totals for a specific country or region), while others use the indicators more intensively to analyze the institutional structure, funding, or impact of agricultural R&D in a particular country or region. Generally, ASTI information has been more likely used by its international and regional audience. When cited or used for analysis, ASTI data has usually been presented at the aggregated global and regional levels. The initiative's primary methods of disseminating data and information through its website and publications have been more likely to reach these types of stakeholders. In comparison, ASTI has been less successful reaching national level stakeholders. One of the biggest communication chal-

lenges for the initiative has been in trying to enhance the relevance of its information for national policymakers and R&D managers.

**Vehicles and Channels of Communication** – Each group of stakeholders has different needs and the use of ASTI information might differ widely from one stakeholder group to the next. Because of this diversity of stakeholder groups, a clear approach as to how to reach each group needed to be defined. For certain stakeholders, the traditional ASTI outputs, which have included country briefs/fact sheets, regional reports, presentations, and other publications, would suffice. Other stakeholders, however, might require custom-made publications and presentations and special events that would focus on issues most relevant to them. In Table 1, we present these audiences and vehicles that have been identified to reach them.

We will focus on three of the major vehicles for communication of ASTI data and analyses: publications, datasets, and website. These three elements have been in place since the beginning of the ASTI project. However, over time, they have been modified to more effectively reach the target groups.

**Publications** – Publications have always been a primary means of transmitting analyses of agricultural S&T indicators. A typical ASTI publication is the country brief, which provides those stakeholders interested in a particular country with an overview of trends of national agricultural research agencies over time. Other reports present regional and global analyses of agricultural R&D investments. For the second round of ASTI surveys, rather than repeating the information found in the original brief, the new briefs were shortened and focused more on trends occurring since the last survey. Although the longer in-depth reports are of interest to researchers, the more concise, to-the-point briefs have been found to be most useful for policy stakeholders who are concerned with having the most recent data available. The most recently designed briefs will have hyperlinks to more data analysis available on the website, to make additional information easier to find. These briefs and factsheets are then followed by reports with more in-depth analyses of the trends underlying key ASTI data, at the global and regional levels, and also at the national levels for select countries.

**Datasets** – Datasets are usually most relevant to researchers conducting analyses on global, regional, or comparative country trends. The ASTI datasets include data on numbers of agricultural scientists and total investments in agricultural research by the government, higher education, and nonprofit sectors of developing countries; yearly short-term data on numbers of scientists by degree status and gender, support staff numbers, funding sources, categories of spending, and research focus by agricultural subsector and by crop and live-stock item. The choice of data to include within the dataset, the way it is presented, and its accessibility are

TABLE 1 – ASTI Audiences and Vehicles of Communication

Audience	Vehicle(s)
<b>NATIONAL</b>	
National policymakers and advisors	<ul style="list-style-type: none"> <li>• Concise publications for quick outreach</li> <li>• High-level events for visibility</li> <li>• Interviews and mentions in local media</li> <li>• Newsletter announcements</li> </ul>
Policy stakeholders and researchers at national research agencies, universities, NGOs, and producer organizations	<ul style="list-style-type: none"> <li>• Publications with national focus including training documents and manuals targeted to local needs and issues, in local language if possible</li> <li>• Workshops, training events</li> <li>• Website: Datasets, tools, online instructions, contact information</li> </ul>
General public	<ul style="list-style-type: none"> <li>• Local media interviews, press releases</li> </ul>
<b>REGIONAL</b>	
Regional and sub-regional agricultural research organizations (e.g., APAARI, ASARECA, CORAF, FARA, FORAGRO)	<ul style="list-style-type: none"> <li>• Publications with regional or sub-regional relevance</li> <li>• Events with collaborators and other stakeholders for visibility</li> <li>• Website: Success stories, access to research and to researchers' bios, etc.</li> <li>• Newsletter announcements</li> </ul>
<b>GLOBAL</b>	
International policymakers, advisors, and donors to agricultural S&T	<ul style="list-style-type: none"> <li>• Publications: Concise publications for quick outreach, research reports of results</li> <li>• High-level events for visibility</li> <li>• Website: Success stories, publications available online, access to researchers and program managers (bios, publication lists, etc.)</li> <li>• Interviews and mentions in local media</li> <li>• Newsletter announcements</li> </ul>
Universities, NGOs, and multilateral and bilateral organizations	<ul style="list-style-type: none"> <li>• Publications</li> <li>• Website: Interactive data tool to allow for easy access to data</li> <li>• Events, workshops with collaborators and other stakeholders for visibility</li> <li>• Publicize research, reports, success stories, events on various web platforms</li> <li>• Newsletter announcements</li> </ul>
UNESCO Institute for Statistics, OECD, and other S&T indicator developers	<ul style="list-style-type: none"> <li>• Engagement in S&amp;T indicator methodology and data collection procedures</li> </ul>
General public	<ul style="list-style-type: none"> <li>• Publications: Summaries of reports</li> <li>• Website and other web platforms: Publicize research, reports, success stories, events</li> <li>• International media: interviews, editorials, press releases</li> </ul>

all factors that affect the usefulness of the data to stakeholders. When ASTI first began and web technology was more limited, data was simply presented on the website as a table. Next, an interface was developed that allowed users to download the specific data they needed in a spreadsheet format. Last year, an interactive data tool was launched that allows the data to be presented in different ways based on user-selected indicators and formats. The tool presents mapping and graph features that offer greater capabilities for analysis by users. The full datasets are, of course, still available to download as spreadsheets. Additional datasets will be made available through hyperlinks in the country fact sheets.

**Website** – The ASTI website currently provides access to ASTI datasets and other outputs. Based on survey feedback by users, it was recently redesigned and expanded to make it more user friendly and readily accessible to all stakeholders. The interactive website allows users to

- Map, view, and compare agricultural S&T data from over 60 low and middle income countries
- Download and export national, regional, and global investment and capacity time series datasets
- Access the ASTI Website Directory, which provides links to a large and growing number of agricultural R&D agencies worldwide

- Develop country web pages that provide links to all relevant ASTI publications, datasets, and other ASTI information; the country pages will also provide links to non-ASTI datasets and relevant information on agricultural and food R&D for the specific country
- Download national, regional, and global ASTI publications

Given that internet connectivity is still difficult in many developing countries, improving the use of ASTI outputs at the national level requires additional efforts at outreach. Raising awareness of the initiative through national forums and media, and building capacity to use agricultural S&T indicators, whether for research, advocacy, or policymaking, are all key components of establishing a national presence. ASTI has always developed national partnerships in the collection of its data, usually working with the country's main government agricultural research agency. However, dissemination of the information collected usually does not spread far beyond that agency.

## Next Steps for the Communication Agenda

ASTI's communication activities have evolved with these lessons learned in mind:

- It cannot be assumed that data is used simply because it is available. Data providers must take the next step of communicating the data to stakeholders.
- Communication should not be one-way only. Encouraging feedback and input from stakeholders improves the quality and use of the data.
- Working with national and regional partners is essential in data collection and dissemination. These partnerships help to improve the quality of the data provided and build capacity for both supply and demand of the data.
- Data should be tailored and presented in various formats and venues to target different stakeholders.
- Resources and time must be allocated to developing and thinking through data communication activities from the very beginning. Communication should not be an afterthought.

The ASTI initiative has sought to increase the usage of its datasets for analytical purposes at the national, regional, and international levels. In addition, increasing the role of its materials in advocacy and priority setting activities by others requires a different mode of interaction than the initiative has used in the past. Going forward, it has identified these next steps for its communication agenda:

- Develop regional, sub-regional links/partnerships to enable a decentralized data collection system with a stronger ownership by national and regional partners. This decentralized system could be initiated in close partnerships with FARA, APAARI and other regional

organizations, and CGIAR centers. These partnerships are also critical to support dialogue on agricultural S&T policy.

- Develop capacity building activities through the establishment and maintenance of a clear set of standards and definitions that will be shared with national and regional partners in order to improve the usage and understanding of ASTI data.
- Improve visibility and usage of the ASTI outputs by expanding the available datasets on the ASTI website, targeting publications and events for different stakeholders, and presenting research agenda and results at upcoming international and regional conferences.
- Sponsor more in-depth studies of agricultural S&T indicators that analyze the underlying trends and issues related to agricultural research capacity and investments.
- Establish internal analytical capacity to improve the use, understanding, and expansion of ASTI data collection and address S&T policy questions critical to the development of effective national agricultural research systems.

## Conclusion

To be useful as input for the development of policy options and priority setting, data and data analyses must be actively communicated to the policy holders. Data collection and dissemination should also be informed by the needs of the policy stakeholders. With an increasing gap in agricultural S&T capacity and investment in developing countries, the need for more attention to agricultural S&T policy is clear. The ASTI initiative has recognized that its function as a data source requires a greater focus on communication to reach those audiences that are informing and setting agricultural S&T policy. As a result, ASTI has expanded its communication activities in a number of ways in an effort to improve its policy relevance.

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# Capitalisation d'expériences et innovations institutionnelles en Afrique de l'Ouest

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**EDITOR'S NOTE:** Paper presented at the IAALD XIIIth World Congress, Scientific and Technical Information and Rural Development, Montpellier, 26–29 April 2010.

**ABSTRACT:** The capitalization experiences built on development projects and programs in West Africa show the links between innovation and capitalizing on experience in a broad sense, including methodologies and practices. Thanks to the knowledge mobilized and lessons learned, these organizations develop their resources, their inter-institutional linkages, their organization and procedures as well as their own methodology and strategic leadership.

**RESUMÉ:** La capitalisation d'expériences permet de promouvoir des innovations institutionnelles. Les expériences de capitalisation des projets et des programmes de développement en

Afrique de l'Ouest montrent l'existence de liens entre capitalisation d'expériences et innovation au sens large, incluant les méthodologies et les pratiques. En effet, grâce au capital connaissance mobilisé et aux leçons apprises, ces organisations développent leurs ressources, leurs liens interinstitutionnels, leurs organisation et procédures, leur méthodologie et leur leadership stratégique.

**RESUMEN:** Las experiencias de capitalización que aprovechan los proyectos y programas de desarrollo en África Occidental muestran los vínculos entre la innovación y la capitalización de experiencias en un sentido amplio, incluyendo metodologías y prácticas. Gracias al conocimiento movilizado y las lecciones aprendidas, estas organizaciones desarrollan sus recursos, sus vínculos interinstitucionales, su organización y procedimientos, así como su propia metodología y liderazgo estratégico.

## Introduction

**Les acteurs du développement**, notamment les personnels impliqués dans les projets et programmes de développement et les organisations de la société civile, ont accumulé une expérience riche et diversifiée sur les approches en matière de développement. Ces approches concernent, entre autres, la création de richesses et la diversification des revenus, la promotion de systèmes de production durable, la gestion des ressources naturelles et des infrastructures. Cependant, les connaissances et savoirs acquis de ces initiatives et expériences ne sont pas toujours accessibles aux autres acteurs du développement, ce qui en limite la portée. En témoigne la quasi inexistence, en Afrique, de travaux scientifiques sur la capitalisation d'expériences. Parmi les raisons d'une telle situation, on peut citer le faible niveau de compétences des acteurs du développement en matière d'identification, de caractérisation et de formalisation des bonnes pratiques et de génération de connaissances. Il en résulte une non-traçabilité et une non-visibilité des expériences de développement en Afrique ainsi qu'une sous-valorisation des savoirs produits.

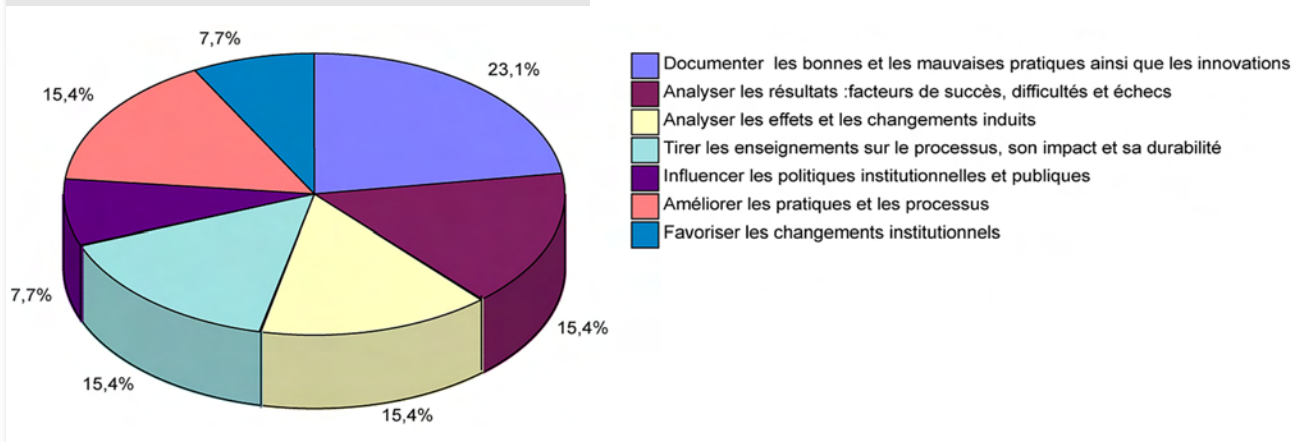
La capitalisation d'expériences est un processus participatif d'identification de thèmes d'enjeux, de collecte, d'analyse et de validation de l'information relative à une expérience donnée. L'enjeu est de partager cette expérience avec d'autres acteurs ou organisations en utilisant des supports adaptés; elle apparaît dès lors comme étant une réponse originale pour relever ces défis.

L'innovation est définie par le Fonds International pour le Développement Agricole (FIDA) comme étant

un processus qui ajoute de la valeur ou apporte une solution à un problème d'une façon nouvelle. Pour être innovant, une idée, un produit ou une approche doit être nouveau dans le contexte dans lequel où il/elle est appliqué(e) et utile par rapport au but recherché ou pour résoudre un problème spécifique capable de durer après la période test. Il existe plusieurs types d'innovation incluant les innovations de type technologique et pratique, de type institutionnel, organisationnel, méthodologique et managérial (processus, partenariat, etc.) et de type politique (nouvelle mesure ou réglementation).

La présente communication se fonde sur les résultats d'une enquête menée auprès d'une trentaine de projets et programmes de développement agricole, d'ONG et d'associations et d'experts en capitalisation d'expériences principalement issus de pays d'Afrique de l'Ouest et du Centre. Un questionnaire articulé autour des pratiques de capitalisation, ses avantages et ses contraintes a été envoyé par courriel aux cibles de l'enquête. Les résultats de cette enquête permettent de présenter une situation de référence de la capitalisation d'expériences en Afrique de l'Ouest et du Centre en ce qui concerne les missions, les dispositifs organisationnels, les processus, les produits, les ressources et les enseignements. Cette communication traite des arguments permettant de montrer les articulations entre la capitalisation d'expériences et les innovations institutionnelles. Enfin, on y recommande les axes d'un programme d'appui permettant d'intégrer la capitalisation et le partage des connaissances dans la gestion des projets et programmes de développement.

FIGURE 1 – Objectifs de la capitalisation d'expériences



### Valeurs ajoutées de la capitalisation d'expériences

La capitalisation d'expériences permet la découverte de la richesse des pratiques et des savoirs locaux non explorés et/ou valorisés. Elle fournit un raccourci pour améliorer les pratiques agricoles. Elle est un moyen de stocker des savoirs et des pratiques afin d'éviter leur disparition prématurée. Initiée par une personne appartenant à un groupe vulnérable (paysan pauvre en ressources, femme, éleveur), la capitalisation d'une expérience contribue, dans certains cas, à rehausser le statut social de l'innovateur. Enfin, elle permet la construction d'une identité propre à l'organisation, la traçabilité des initiatives, la lisibilité et la visibilité de l'expérience.

La capitalisation d'expériences a notamment pour objectifs de :

- générer des connaissances nouvelles pour améliorer les pratiques,
- documenter et reproduire les bonnes pratiques et analyser les échecs,
- inspirer d'autres acteurs du développement à adopter de nouvelles politiques institutionnelles ou publiques,
- conforter les partenaires dans la mobilisation de ressources.

Elle est un fil conducteur de l'efficacité au sein des organisations qui la pratiquent.

La capitalisation d'expériences est un processus multi-acteurs. Le plus souvent, plusieurs parties prenantes participent à l'exercice. Parmi elles, figurent les membres de l'équipe du projet, les bénéficiaires, les témoins de l'expérience et les facilitateurs de processus.

### Situation de référence de la capitalisation d'expériences

Les missions des organisations de développement en matière de capitalisation d'expériences s'articulent autour de la facilitation, la création et l'échange de connais-

sances, le suivi d'impact, la mise en œuvre des activités ainsi que l'analyse des succès et des insuffisances/échecs du projet/programme dans un processus d'apprentissage continu. A cela s'ajoutent la valorisation des initiatives des acteurs en vue d'accroître leur crédibilité vis-à-vis des décideurs et des partenaires du développement et l'amélioration de l'offre de services/produits/pratiques existants. Les objectifs poursuivis par ces organisations sont de documenter les bonnes et mauvaises pratiques ainsi que les innovations, de comprendre les facteurs de succès et d'échecs, les effets et les changements induits afin de tirer les enseignements sur des processus, leur impact et leur pérennité. En outre, il s'agit de comprendre l'influence des apprentissages sur les politiques institutionnelles et publiques. La figure 1 ci-après, issu des données de l'enquête, présente les objectifs de la capitalisation d'expériences (Figure 1).

L'animation du processus de capitalisation d'expériences est assurée par une équipe sous la responsabilité des chargés de suivi-évaluation ou des chargés de communication. Dans certains cas, les institutions ont recours à des consultants pour les accompagner dans l'élaboration d'un plan de capitalisation d'expériences, dans la gestion des interfaces entre les différentes parties prenantes et le contrôle de la qualité des processus et de produits.

Les organisations procèdent à des opérations d'identification, de sélection et de validation d'un thème de capitalisation. En outre, elles décrivent et analysent l'expérience avant de rédiger un document de capitalisation qu'elles diffusent. Cependant, les résultats de ces travaux ne font pas souvent l'objet d'un débat critique, ce qui limite la portée des enseignements.

Les outils et méthodes de capitalisation d'expériences généralement utilisés sont les fiches d'expérience et le SEPO (Succès, Echecs, Potentialités et Obstacles). Certains acteurs utilisent la croix des acteurs, le tableau des intérêts, le tableau des mesures, la grille des rôles et des entretiens de groupe. Aucune des institutions n'a mentionné l'existence de critères explicites ni celle de comité de sélection et de validation de thèmes de capitalisation d'expériences.



TABLEAU 1 – Supports de communication

Supports de Communication	Nb. cit.	Fréq.
Publications imprimées	20	90,9%
Publication	10	45,5%
Site Web	5	22,7%
Supports audio	2	9,1%
Photos	1	4,5%
Film documentaire	1	4,5%
Présentation powerpoint	1	4,5%
Participation à des foires + expositions itinérantes	1	4,5%
<b>TOTAL OBS.</b>	<b>22</b>	

Les supports de communication des résultats de capitalisation d'expériences les plus utilisés sont la publication, le livret, le poster et les cas de succès. Ensuite, viennent les cahiers thématiques, les récits de vie et les sites web. En dernier lieu, on note l'utilisation du film documentaire, la production de manuels de formation, la mise en place de stands d'exposition lors des foires et la diffusion d'émissions au niveau des radios FM (Tableau 1).

Les ressources allouées à la capitalisation d'expériences sont consacrées à la formation du personnel, aux publications et à la participation aux échanges des réseaux et communautés de pratique. Les organisations qui soutiennent les initiatives de capitalisation en Afrique de l'Ouest sont la Banque Mondiale, le FIDA, le Centre for Research and Information on Low External Input and Sustainable Agriculture (ILEIA), le MISEREOR ainsi que les gouvernements.

Les principales initiatives de politique institutionnelle inspirées par la capitalisation et l'échange d'expériences sont la reproduction de l'expérience par d'autres structures. A titre d'exemple, la caravane des initiatives du Projet de promotion des Micro-Entreprises Rurales (PROMER) I Sénégal, a permis, en tant que support d'information, la diffusion et l'adoption de la pratique des fours améliorés, qui a été répliquée dans les zones de Kaolack et de Fatick. Ces expériences ont également été reprises par d'autres projets d'entrepreneuriat rural.

Les principaux enseignements tirés des initiatives de capitalisation d'expériences sont centrés sur la connaissance du Projet. Dans les projets interrogés, la capitalisation permet de systématiser les pratiques diffuses et de les porter à la connaissance des différents acteurs. Elle est à la fois un processus de formalisation et de valorisation des ressources, de partage des acquis et d'apprentissage. Elle constitue une forme de mémoire institutionnelle utile tant pour des praticiens que pour des concepteurs.

La capitalisation d'expériences permet la crédibilisation de l'institution prestataire auprès de l'institution commanditaire: elle accroît la notoriété du prestataire et fidélise et renforce les liens de partenariat créés.

Trois quarts des répondants considèrent que l'impli-

cation des acteurs dans la capitalisation d'expériences apporte beaucoup d'avantages dont le plus significatif est le renforcement des compétences, suivi de l'amélioration de la qualité, le gain financier et le gain de temps.

Certaines institutions mettent en avant l'amélioration de la visibilité institutionnelle, la prise de conscience des capacités, la duplication des pratiques et l'augmentation de la productivité. Par exemple, au Mali, la documentation d'une pratique novatrice portant sur le développement d'une couveuse à partir de matériaux locaux a fait l'objet d'une large

diffusion. Ceux qui l'ont adopté ont ainsi quasiment triplé leur capacité de couvain initial.

Cependant, on note une faible reconnaissance de l'importance de la documentation des expériences. Un soutien minimal par l'allocation de ressources permettant de documenter les expériences n'est pas toujours assuré.

## Capitalisation d'expériences et innovation

En premier lieu, on constate la production de livrets de capitalisation d'expériences. On peut citer notamment le livret décrivant et présentant l'ensemble des outils de diagnostic et de planification établis par le Programme d'Aménagement des Bassins Versants (PABV) en 1995 en République de Guinée et financé par l'Union Européenne ainsi que le livret décrivant les démarches participatives de diagnostic et de planification utilisées pour le Projet de Gestion des Ressources Naturelles (PGRN) en 1998. A travers un processus d'auto-évaluation, les deux Unions de femmes appuyées par Enda Pronat à Diender et à Keur Moussa (Sénégal) ont également réalisé un livret pour présenter les résultats de leur démarche et déterminer leurs forces au sein de ces Unions en 2008.

On observe également la construction d'une compétence institutionnelle avérée en capitalisation. Plusieurs dizaines d'expériences ont été capitalisées et diffusées auprès des paysans, des chercheurs, des agents d'encadrement et des ONG. Il s'y ajoute la prise en compte des recommandations dans les dispositifs institutionnels et législatifs (capitalisation sur les conventions locales), la constitution de réseaux d'innovateurs dont les expériences ont été capitalisées et aussi de plusieurs réseaux nationaux de capitalisation des pratiques d'agriculture durable.

Il convient également de relever la capitalisation d'une vingtaine d'expériences dont certaines ont fait l'objet d'une publication dans la revue AGRIDAPE.

**Cas de succès** – Entre 1992 et 1996 le Dr Monty Jones et ses collaborateurs scientifiques à ont mis au point dans le cadre de l'Association pour le Développement de la Riziculture en Afrique de l'Ouest (ADRAO), des variétés

de riz NERICA (initialement appelée Bintou) qui ont été cultivées par les petits riziculteurs au Sénégal. L'expérience des chercheurs pour la production de riz a augmenté et permis d'assurer la sécurité alimentaire nationale. Cette expérience a été documentée à profusion dans des dépliants en couleur, films et documentaires, ainsi que dans des journaux et magazines internationaux. La documentation sur le riz NERICA a suscité un intérêt considérable en Afrique occidentale, auprès des partenaires du développement au niveau international et des donateurs. En conséquence, l'ADRAO a obtenu une reconnaissance internationale et une crédibilité scientifique de haut niveau et a pu mobiliser d'importantes ressources financières pour le financement de ses activités de recherche-développement sur le riz.

La Fondation Rurale pour l'Afrique de l'Ouest (FRAO) a été sollicitée par le FIDA, pour documenter une approche méthodologique pour la capitalisation d'expériences à l'attention des projets qui n'avaient aucune connaissance dans ce domaine. Avec le savoir qui en est résulté, la FRAO a incité les projets et programmes du FIDA à développer un réseau de partage des connaissances et des savoirs.

**Changements induits** – Plus de la moitié des personnes interrogées considèrent que la capitalisation d'expériences valorise les expériences et améliore la visibilité et la notoriété institutionnelle. Non seulement elle favorise l'apprentissage et le renforcement des capacités du personnel mais permet aussi le renforcement du travail d'équipe et le développement du partenariat et du réseautage. Un peu plus du tiers des personnes interrogées estime que la capitalisation d'expériences permet un meilleur positionnement stratégique, la constitution d'un capital de savoir et l'amélioration des pratiques institutionnelles au sein des projets et des programmes de développement. Près de 20% d'entre elles estiment que la capitalisation d'expériences facilite la disponibilité d'arguments pour le plaidoyer et, dans une moindre mesure, l'accessibilité à des ressources financières.

En effet, grâce au capital connaissance mobilisé et aux leçons apprises, ces organisations développent leurs ressources, leurs liens interinstitutionnels, leurs organisation et procédures, leur méthodologie et leur leadership stratégique (Tableau 2).

Les personnes interrogées proposent un changement de rôle social (passage du statut de producteur au statut de formateur) et un changement d'échelle (élargissement: l'appui passe d'une localité vers d'autres localités).

Le développement des capacités d'analyse des expériences permet aussi d'examiner de manière critique ces expériences en vue d'en tirer des leçons pour une utilisation plus large par d'autres acteurs.

TABLEAU 2 – Champs d'innovations

Innovations institutionnelles	Nb. Cit.	Fréq.
Développement des ressources	16	72,7%
Renforcement des liens interinstitutionnels	14	63,6%
Développement organisationnel	10	45,5%
Innovation méthodologique	9	40,9%
Renforcement du leadership	9	40,9%
<b>TOTAL OBS.</b>	<b>22</b>	

La capitalisation d'expériences permet aussi d'identifier l'apport de l'organisation dans un champ de pratique professionnelle ou sociale spécifique et de valoriser ainsi sa marque distinctive afin de mieux positionner l'organisation.

Elle fournit également des arguments pour le plaidoyer, la mobilisation de ressources particulièrement si les résultats obtenus permettent de promouvoir la crédibilité institutionnelle, levier essentiel pour attirer des partenariats et des collaborations.

Enfin, elle permet le renforcement de la connaissance organisationnelle et son ouverture vers d'autres institutions à travers son intégration dans un ou des réseaux ou communautés de pratiques. Le système d'apprentissage mutuel renforce le système de gestion d'une organisation et permet de générer et de mettre en valeur des savoirs locaux et les innovations.

**Défis et perspectives** – L'aspect le plus critique de la capitalisation d'expériences est la maîtrise des itinéraires: choix du thème, connaissance des sources d'informations, description de l'activité, analyse des succès et des faiblesses, communication appropriée. Il convient donc de bien maîtriser ce que les autres peuvent tirer de la capitalisation d'expériences et ce que la structure "capitalisatrice" attend de ce processus.

Un autre défi concerne la simplification des messages et des enseignements tirés de la capitalisation. La simplicité et la concision permettent de valoriser les résultats surtout si les cibles primaires sont constituées de communautés et de paysans analphabètes.

L'institutionnalisation de la politique et des pratiques de capitalisation constitue le défi majeur des projets et programmes de développement, et tout spécialement ceux d'entre eux qui ne documentent pas leurs expériences à temps entraînant le risque que ces dernières perdent tout leur sens et leur teneur en information. Diffuser le résultat de la capitalisation, afin de mieux faire connaître l'organisation et faire en sorte que d'autres en profitent, participe au développement d'une stratégie de communication institutionnelle qui est aujourd'hui mal maîtrisée.

C'est pourquoi il est très important de transférer les capacités en matière de formation sur la capitalisation

aux projets et programmes de développement et de promouvoir une stratégie de plaidoyer pour influencer les politiques nationales et institutionnelles, à partir des expériences et pratiques locales capitalisées. Ainsi, la capitalisation pourrait s'intégrer dans les pratiques organisationnelles pour devenir une culture institutionnelle favorisant des niveaux d'investissement adéquats.

**Développement des outils et méthodes** – Trente-huit pour cent des personnes interrogées ne disposent pas d'indicateurs leur permettant de mesurer l'apport de la capitalisation d'expérience. Les répondants qui en disposent indiquent comme critères le changement de statut et les retombées médiatiques. Elles mentionnent aussi le type et le nombre d'expériences adoptées suite à leur diffusion.

D'autres indicateurs suggérés sont l'incitation à la mise en place d'un site web pour la présentation des expériences capitalisées, le recrutement par un autre projet (au vu des réalisations capitalisées) et l'acquisition de nouvelles connaissances.

Il ressort de cette analyse de la situation en Afrique la nécessité de former les acteurs de développement sur le processus de capitalisation d'expériences. Ces sessions de formations doivent avoir un triple objectif:

- sensibiliser les décideurs sur les enjeux de cette approche,
- créer une masse critique d'animateurs de processus et de personnel de projet capables de documenter une expérience,
- les doter d'outils simples de capitalisation et de diffusion des pratiques.

Ces formations devraient être consolidées par des applications, des enseignements et les leçons apprises.

Il convient aussi de promouvoir le renforcement des réseaux d'information existants sur les pratiques de capitalisation d'expériences en utilisant les nouvelles technologies de l'information et de la communication pour partager les savoirs: émissions de radio, forums électroniques, sites web, bibliothèques virtuelles, centres de ressources et bases de données, rencontres et visites d'échanges, etc.

## Conclusion

Au total, la situation générale de l'Afrique de l'Ouest en matière de capitalisation d'expériences est globalement faible même si on assiste aujourd'hui à l'émergence d'initiatives pour documenter les pratiques dans les projets de développement. Les expériences actuelles montrent qu'il y a un lien fort entre capitalisation d'expériences et innovations notamment par l'identification et la mise en valeur de bonnes pratiques et la diffusion de celles-ci. Toutefois, les capacités dans ce domaine restent encore très faibles et il convient de renforcer les capacités des institutions de projets de développement en capitalisation d'expériences par la formation et par leur mise

en réseau. Ceci permettra de tirer le meilleur profit des savoirs et des innovations disponibles en Afrique.

## Lectures Complémentaires

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Fall, Ndeye Coumba, and Ndiaye, Adama. 2005. *Méthodologie de capitalisation et de valorisation des expériences des projets et programmes du FIDA en Afrique de l'Ouest et du Centre*, Dakar: FIDAFRIQUE, 57 p.

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*Partager les leçons et les expériences pour de meilleurs résultats dans le développement en Afrique Subsaharienne tenu du 20 au 22 avril 2009 à Nairobi*, Dakar: FRAO, 19 p.

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## Contact Information

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Ndeye Coumba Fall  
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FIDAFrique  
E-mail: ncfall@frao.info



### Message from the IAALD President

Dear IAALD Members,

There is much to report, although I will make it brief this time as I depart later today on a two week business trip. However, I did not want to leave without letting you know about the many exciting initiatives and events that are ahead for IAALD members.

First, I am extremely pleased to announce plans for the **14th IAALD World Congress to be held July 22–25, 2013 at Cornell University**. The theme will be *Emerging Priorities for Scientific Information Research and Discovery*. Plans are already being made for innovative and diverse programming as well as opportunities for learning and networking with agricultural information professionals from around the world. A conference website will be made available in the coming months to provide many more details. In the meantime, we thank our IAALD member colleagues at the Albert R. Mann Library at Cornell University for submitting an excellent proposal to serve as our 2013 hosts!

We also have other conferences in the planning stages. Yesterday, you should have received the **Call for Papers** for our co-sponsored conference to be held in **Windhoek, Namibia** next July. This will be a wonderful opportunity to network with professionals in related fields. Following on the Namibia conference will be the **IAALD Africa conference in 2012** that will also involve other organizations such as INFITA and WCCA. And, in addition, we are excited and extremely pleased to report we are having excellent discussions on the possibility of holding an **IAALD International Conference in India in 2012**. We will send you many more details about these important member opportunities in future communications.

As I reported in last month's message, the Executive Committee is holding monthly conference calls working through a lengthy list of agenda items. The first order of business this month was to welcome our expanded membership on the E.C. We now have official liaisons from FAO (**Stephen Rudgard**), GFAR (**Ajit Maru**), and IICA (**Federico Sancho**) — all who are lending their expertise and ideas to the new directions IAALD is taking in its organizational structure and member services. We also had the participation of **Roger Mills** on the call who is working to build an IAALD U.K. Chapter. The conference calls are recorded so other E.C. members who are unable to participate due to time differences and challenging schedules can still provide input. In this way, we have gained excellent insights from **Justin Chisenga** (IAALD Africa Chapter president) and **Xianxue Meng** (China Chapter).

I wanted to also take this opportunity to thank our IAALD website redesign team for their continued efforts. Due to the good work of **Maria Folch** at FAO and the entire team, there is now a preliminary site up that will soon be reviewed by E.C. members. We will keep you informed of progress.

Other ongoing activities include:

- **AIW** – a new issue with papers from the Montpellier Congress will be out soon; plans for special issues in 2011 are also in discussion.
- **Organizational documents** in preparation (Regional and Country Chapter Organizational Checklist, Conference Hosting Guidelines, Member Benefits pamphlet, E.C. Roles and Responsibilities, and Communications Plan).
- **IAALD Webinars** – an announcement will be sent out in October with details about our first planned webinar series. Stay tuned!

Here is my first “**Did you know?**” piece of IAALD **trivia** — listserv subscribers include 109 using Yahoo, 17 using Gmail, and 13 using Hotmail. We also have 32 members with a CGIAR address and 45 from .edu addresses. It seems Yahoo is our winner!

Our **IAALD Facebook** page is also increasing in activity with 550 visits last week and the numbers of active users continuing to rise as well. Check out: <http://www.facebook.com/pages/International-Association-of-Agricultural-Information-Specialists-IAALD/12172668666>

And, don't forget our amazing **IAALD Blog** for staying current on all manner of professional activities and interests: <http://iaald.blogspot.com/>

Here is a reminder, too, to consider joining the IAALD **ning** (our place for IAALD discussions and announcements) at URL: <http://iaaldnetwork.ning.com>.

**Our next E.C. conference call is scheduled for October 6th.** I will be back in touch with further updates after that.

Sending you all my very best regards as well as greetings from the entire E.C. (Toni, Peter, Edith, Odile, Elizabeth D., and Jaron),

Barbara Hutchinson, IAALD President  
[posted on the IAALD Listserv 17 September 2010]

## Meet the New Officers:

### *President,*

#### **Dr. Barbara Hutchinson (USA):**

Dr. Hutchinson is Assistant Director of the Agricultural Experiment Station and Director of International Program Development at the University of Arizona (USA). She is particularly interested in using information technologies to support learning and decision making and, in that capacity, she is involved in a collaboration to develop a Global Rangelands knowledge system. She has served on the IAALD Executive Committee for five years and, previously, as President of the United States Agricultural Information Network (USAIN) and Chair of the Agriculture Network Information Center (AgNIC). Her interest in IAALD extends back to 1985 when she joined the Association and attended her first World Congress in Ottawa, Canada. She served as Chair of the 1997 joint conference of IAALD and USAIN held in Tucson, Arizona. Dr. Hutchinson formerly served as Director of the Arid Lands Information Center at the University of Arizona where she developed extramural projects to disseminate information about the world's arid regions.

E-mail Address: [Barbara.Hutchinson@iaald.org](mailto:Barbara.Hutchinson@iaald.org)

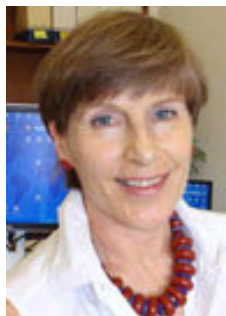


### *Vice President,*

#### **Dr. Edith Hesse (Austria):**

Dr. Hesse is Head of Corporate Communications and Capacity Strengthening at CIAT, the International Center for Tropical Agriculture, in Cali Colombia. She has been part of the CGIAR since 1979 when she joined the Economics Program at the International Center for Maize and Wheat Improvement (CIMMYT) in Mexico and in 1984 became the leader of a scientific information management project funded by IDRC (International Development Research Center, Canada). In this context she implemented various innovative scientific information management and knowledge sharing approaches within at the CIMMYT and at CGIAR level, as well as executed a variety of consultancies commissioned by the World Bank, the Kellogg Foundation and other entities in Latin America, Africa and Asia. Dr. Hesse has been involved in IAALD since 1984 and served on the IAALD Executive Committee from 1995–2000.

E-mail address: [e.hesse@cgiar.org](mailto:e.hesse@cgiar.org)



### *Past President,*

#### **Peter Ballantyne (UK):**

Peter Ballantyne is Head, Knowledge Management and Information Services at the International Livestock Research Institute (ILRI) in Addis Abba, Ethiopia. Between 2005 and 2009, he was Director of Euforic, a non-profit cooperative that promoted information sharing and access on Europe's International Cooperation. He previously worked for the International Service for National Agricultural Research (ISNAR), the European Centre for Development Policy Management (ECDPM), International Institute for Communication and Development (IICD) and the International Network for the Availability of Scientific Publications (INASP). He has been an IAALD member since 1983; he served as IAALD's President from 2005–2010.

E-mail Address: [p.ballantyne@cgiar.org](mailto:p.ballantyne@cgiar.org)



### *Secretary/Treasurer,*

#### **Antoinette Paris (Toni) Greider (USA):**

Ms. Greider is beginning her second term as Secretary/Treasurer of IAALD and is currently the Director of International Programs at the University of Kentucky Libraries (Lexington, KY USA). Her previous positions include Director of the Agriculture Library at the same University for 32 years. She has been active in many professional organizations including serving as President of United States Agricultural Information Network (USAIN) from 1995 to 1998. She has been a member of IAALD her entire professional career and has been active since 1990, serving as the IAALD editor from 1990–2000; chair of the XIth IAALD World Congress held in Lexington, Kentucky in 2005 and Secretary/Treasurer from 2005–2010.

E-mail: [Toni.Greider@iaald.org](mailto:Toni.Greider@iaald.org)



### *Board Member (1 year position),*

#### **Dr. Elizabeth Dodsworth (UK):**

Dr. Dodsworth is Global Director, Knowledge Management at CABI. She has 22 years of experience in information dissemination and is a trained teacher who as taught in the United Kingdom and Gambia. She has also been a researcher in animal science at the National Institute for Research in Dairying and a lecturer to extension workers in St. Luca. Dr. Dodsworth served on the IAALD Executive Committee from 2005–2010 and is filling the 1 year position on the board.

E-mail: [e.dodsworth@cabi.org](mailto:e.dodsworth@cabi.org)





**Board Member (2 year position),  
Odile Bedu (France):**

Ms Bédu is in charge of Information in the International Relations Department of INRA (Institut national de la recherche agronomique, France), a position she has held since 2000. Prior to joining the International Relations Department, she was a documentalist, and a library director in the agricultural economics and agrofood sector, INRA, Montpellier. During this time, she also was a part time lecturer in several higher education institutions in Montpellier. She has taken part in several European projects to modernize libraries in Central Europe. She is involved in many professional associations (ADBS, Agropolis-IST), where she defends the sharing of information. Her main publication focus is bibliometric analysis. Ms. Bedu is a relative new member to IAALD but her participation in the two IAALD congresses in 2008 and 2010 led her to join the IAALD Executive Committee. She is serving in a 2 year board position.

E-mail: [bedu@supagro.inra.fr](mailto:bedu@supagro.inra.fr)



**3 Year Board Position,  
Jaron Pociello (USA):**

Ms. Porciello is the Coordinator for Instruction and Business Information Programs at Albert R. Mann Library, Cornell University. In her prior position she was the International Programs Librarian, TEEAL Director at Mann Library and she continues to work closely with The Essential Electronic Agricultural Library (TEEAL) and other international programs supported by Mann and Cornell. She is the chair of the Research4Life (HINARI, AGORA, OARE) training team and is also a member of the Research4Life Executive Council. Jaron received her M.L.S. ('06) and M.A., Literature ('07) from Indiana University. She is delighted to be a part of the IAALD board, and looks forward to working with partners and members worldwide on energetic and productive partnerships. Ms. Porciello is a new member of IAALD and is filling a 3 year position on the IAALD Executive Committee.

E-mail: [jat24@cornell.edu](mailto:jat24@cornell.edu)



**Positions not elected by the General Membership  
Representing Chapters —**

**President IAALD Africa: Justin Chisenga**  
([Justin.Chisenga@fao.org](mailto:Justin.Chisenga@fao.org))

**President Central/Eastern European Chapter:**  
**Michal Demes** ([michal.demes@fao.org](mailto:michal.demes@fao.org))

**Chairman, China Chapter: Professor Meng Xianxue**  
([meng@mail.caas.net.cn](mailto:meng@mail.caas.net.cn))

**Roger Mills, UK Chapter (in formation):**  
([Roger.Mills@ouls.ox.ac.uk](mailto:Roger.Mills@ouls.ox.ac.uk))

**Representing Sister and Partner Organizations  
(non voting members of the EC) —**

**IAALD Representative: Naohisa Koremura**  
([koremura@nodai.ac.jp](mailto:koremura@nodai.ac.jp))

**FAO Representative: Stephen Rudgard**  
([Stephen.Rudgard@fao.org](mailto:Stephen.Rudgard@fao.org))

**IICA Representative: Federico Sancho**  
([federico.sancho@iica.int](mailto:federico.sancho@iica.int))

**GEAR Representative: Ajit Maru**  
([Ajit.Maru@fao.org](mailto:Ajit.Maru@fao.org))

**A Warm Welcome from the French  
for the XIIIth IAALD World Congress**

In April of this year 257 people from 55 countries attended the 13th World Congress of IAALD held on the campus of SupAgro INRA in beautiful Montpellier, France. The conference theme of *Scientific and Technical*

SupAgro INRA prepares to welcome  
IAALD conference attendees.

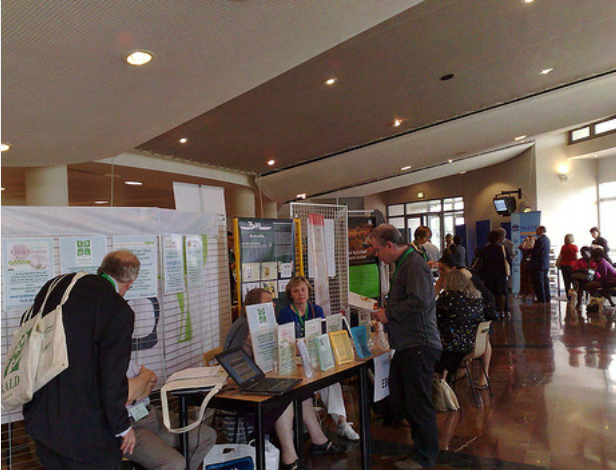


The beautiful conference venue  
of SupAgro INRA Montpellier.





The CIARD Market provided attendees an opportunity to network with CIARD Partners



Christine Slivy explains the conference arrangements during the opening session of the conference.



*Information and Rural Development* provided an excellent venue for presentations, exhibits and stimulating conversation among the people attending. The physical arrangements for the conference were excellent allowing attendees to visit exhibits, attend sessions, and network all in one area. The wonderful buffet lunches were served outside allowing attendees to bask in the warm April sun.

The conference opened on April 26th with the “Infor-

mation Access Marketplace” an exhibition of participants in the CIARD Initiative (Coherence In Agricultural Research and Development). The CIARD initiative was launched at the 12th IAALD Conference in Atsugi City and the market place clearly showed that much progress has been made in the initiative in the past two years. In addition to IAALD, participants in the market place included organizations such as FAO, CTA, CABI, and CIRAD to name a few. The marketplace invited attendees

### ***Conference Themes***

- Theme 1: Innovative Learning Process
- Theme 2: Targeted Information Products and Services
- Theme 3: Communication and Information Exchange Between Actors
- Theme 4: Integrated Information Systems
- Theme 5: Information as Public Policy Enablers

IAALD members enjoy dancing to Hurdy Gurdy music at the “Hôtel de ville de Montpellier”.



View of the charming “Ville” of Montpellier, the oldest part of the city.



The outdoor lunches and breaks included wonderful French food and beautiful Montpellier weather.



Conference attendees enjoy some “social networking” along with the dancing at the “Hôtel de ville Montpellier.”



to talk with participants about the project and how they could become involved. Attendees were also given the opportunity to tour the SupAgro Library located near the conference center. The day culminated with a cocktail reception featuring some wonderful French food held in the reception hall where old acquaintances reconnected and new acquaintances were made.

At 9 a.m. on Tuesday morning conference attendees were officially welcomed to Montpellier and SupAgro and introduced to the conference theme and the agenda for the conference. After a break in the Exhibition Hall the five themes were introduced by 5 keynote speakers and the attendees had the difficult task of choosing among the four to five simultaneous presentations in the different conference themes.

On Tuesday evening, IAALD Members came together in the IAALD General Assembly to conduct the business of the organization. This meeting was a milestone for IAALD as it was the first conducted under the new IAALD governance structure. IAALD President Peter Ballantyne presented a slate of officers for 2010-2011. The slate was billed as a transition slate to manage the change in the IAALD organizational structure. After some discussion, the slate was approved by acclamation. The new Executive Committee for IAALD are Barbara Hutchinson, President, Edith Hesse, Vice President, Peter Ballantyne, Past President, Toni Greider, Secretary/Treasurer, Elizabeth Dodsworth, Odile Bedu, Jaron Porciello as board members. Other board members include Justin Chisenga, IAALD Africa, Meng Xianxue, IAALD China Chapter and representatives from FAO, IICA, GFAR, CTA, and CGIAR. The group was charged with fully implementing the new Governance Structure.

The social highlight of the conference was a wine tasting and dinner at Sale des rencontres of the “Hôtel de ville de Montpellier”. The evening began with a small educational session on the wines of the Languedoc region and then the food and dancing began. The group was treated to Hurdy Gurty music and invited to dance. It was a wonderful social evening filled with good wine, food and fun.

The Montpellier Congress closed on Thursday 29 April 2010 with an informative and interactive sessions facilitated by outgoing IAALD president Peter Ballantyne of ILRI. The session aimed at review in plenary what it has been discussed, what it was we learned and what challenges were identified. The session ended with an official thank you from IAALD to the conference committee with gifts of flowers and Ethiopian shawls.

The weather was spectacular and IAALD Conference attendees got an opportunity to visit some open spaces. Groups had an opportunity to visit the Botanical Garden, Faculty of Medicine, Agropolis Museum or just spend some free time in Montpellier. Montpellier is a beautiful City with a charming “Ville”, the old city that is open to foot traffic only. The conference and the city were a wonderful experience for all who attended.

While not technically a virtual conference, many attendees shared the conference by using the social media. On the following page is the July 8th posting on AgInfo News by Pier Andrea Pirani and Peter Ballantyne on the social reporting from the XIIIth IAALD World Congress.

*Toni Greider*



A number of conference attendees took advantage of an organized tour of the Botanical Gardens.



### **Social Report at IAALD 2010: How Good Have We Done?**

While the IAALD 2010 congress sessions were unfolding and information systems, services and products, communication and information exchange were discussed in Montpellier, we used some social media to capture messages from the congress.

This approach, generally known as 'social reporting', puts together and connects a series of web tools and spaces to record conversations happening in a face to face event. The content created is shared using audio, video, slideshows and photos to accompany the written record. This content is remixed and reused in different information products. Travelling on RSS feeds it passes through multiple channels to reach different online communities and users. Using a common tag, this content can be easily aggregated, tracking the outputs of several people attending a meeting.

In Montpellier, we agreed to use *aginfo10* as the event tag. All the content created was tagged with this label.

We tracked 30 'blips' — video interviews recorded and published during the event. Twenty-five were published on the IAALD channel. We also blogged on this blog as well as other blogs. We uploaded 61 presentations to SlideShare - there are some 80 slide shows in total with the tag *aginfo10*. We created an IAALD 2010 group on Flickr where different people could share their photos. We also used the IAALD Twitter channel and sourced the tweets of other users and followers.

Finally, we collected all content and published it in a consolidated event feed. All the various conference outputs we could find are also tagged *aginfo10* on [www.delicious.com](http://www.delicious.com) (157 Bookmarked items).

Besides defining and sharing the conference tag, a key element was to plug and integrate the different tools and applications in a 'system' with several entry points and publishing channels. We didn't just publish on social media platforms, we wanted to make sure the

### ***IAALD Invited to Cornell for the XIVth World Congress***

**The 14th IAALD World Congress** will be held July 22–25, 2013 at Cornell University. The theme will be "Emerging Priorities for Scientific Information Research and Discovery". Plans are already being made for innovative and diverse programming as well as opportunities for learning and networking with agricultural information professionals from around the world. A conference website will be made available in the coming months to provide many more details.

content was picked up by a wide range of groups and communities — on twitter, ning, facebook, blogs, and feedreaders. RSS feeds were a key mechanism to animate this content dissemination.

To date, our statistics — one month after the event — show:

- We produced 30 videos, attracting some 2,000 views, or 59 views per video. The most-viewed video is a CABI interview published on Youtube.
- In April 2010, views of the IAALD blog and website increased by a third from the previous month.
- We shared 61 Powerpoint presentations, attracting 18,875 views, or 310 views per presentation
- Items listed in the congress news feed were viewed 4200 times between April and June 2010.
- More than 300 postings with the *aginfo10* hashtag were tweeted or retweeted on Twitter just before, during and after the congress. The majority were during the event itself. Some 20 different people relayed the congress on Twitter.

Not to forget the 'social' aspect of social reporting, we want to thank all the followers, friends and colleagues who contribute to this effort, by writing, commenting, circulating and signposting the snippets of conversations captured in Montpellier.

*Pier Andrea Pirani and Peter Ballantyne*

## IAALD Report and Accounts for the Years Ended December 31, 2009 and 2008

August 16, 2010

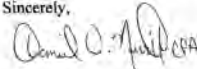
Antoinette Greider  
International Association of Agricultural Information Specialists  
P.O. Box 63  
Lexington, KY 40588

I have compiled the accompanying statement of financial position of International Association of Agricultural Information Specialists (a not for profit organization) as of December 31, 2009 and 2008, and the related statements of activities and cash flows for the year then ended, and the accompanying supplementary information, which is presented for supplementary analysis purposes, in accordance with Statements on Standards for Accounting and Review Services issued by the American Institute of Certified Public Accountants.

A compilation is limited to presenting in the form of financial statements information that is the representation of management. We have not audited or reviewed the accompanying financial statements and supplementary information and, accordingly do not express an opinion or any other form of assurance on them.

Management has elected to omit substantially all of the disclosures required by generally accepted accounting principles. If the omitted disclosures were included in the financial statements, they might influence the user's conclusions about the Organization's financial position, results of operations, and cash flows. Accordingly, these financial statements are not designed for those who are not informed about such matters.

Sincerely,



Daniel W. Nevitt

Certified Public Accountant

See Accountant's Compilation Report

## STATEMENT OF FINANCIAL POSITION — December 31, 2009 and 2008

	2009	2008
<b>ASSETS</b>		
<b>CURRENT ASSETS</b>		
Cash in Checking	\$ 3,565.15	\$ 9,964.80
Cash in Savings	24,495.06	20,777.81
Cash on Hand	470.01	44.01
Total Cash	28,530.22	30,786.62
Advance Payment On Credit Card	-	971.34
<b>TOTAL CURRENT ASSETS</b>	<b>28,530.22</b>	<b>31,757.96</b>
<b>TOTAL ASSETS</b>	<b>\$ 28,530.22</b>	<b>\$ 31,757.96</b>
<b>LIABILITIES</b>		
<b>CURRENT LIABILITIES</b>		
Credit Cards Payable - Chase Business	\$ 100.74	\$ -
<b>TOTAL CURRENT LIABILITIES</b>	<b>100.74</b>	<b>-</b>
<b>LONG-TERM LIABILITIES</b>	<b>-</b>	<b>-</b>
<b>TOTAL LIABILITIES</b>	<b>100.74</b>	<b>-</b>
<b>NET ASSETS</b>		
Unrestricted Net Assets	28,429.48	31,757.96
<b>TOTAL LIABILITIES AND OWNER'S EQUITY</b>	<b>\$ 28,530.22</b>	<b>\$ 31,757.96</b>

## STATEMENT OF ACTIVITIES — For Year Ending December 31, 2009 and 2008

	2009	2008
<b>UNRESTRICTED NET ASSETS</b>		
Support		
Conferences	\$ 3,709.00	\$ -
Currency Conversion	-	595.19
Donations	726.85	121.00
Grants	6,510.00	20,369.18
Interest Income	23.81	186.21
Membership Dues	11,501.50	10,772.54
Miscellaneous Income	161.06	4,044.74
IAALD Africa	11,127.00	-
Sales	275.72	1,300.74
Subscriptions	2,992.00	4,983.00
Subtotal Support	37,026.94	42,372.60
Less: Rebates and Discounts	(1,541.00)	(167.50)
Net Assets Released From Donor Restrictions	-	-
<b>Total Support</b>	<b>35,485.94</b>	<b>42,205.10</b>
Service Expenses		
Administrative Expenses	3,615.33	4,983.59
Executive Committee Meetings	177.13	-
Grant Expenditures	6,763.89	14,032.76
Journal Expenses	26,244.19	16,883.75
Membership Expenses	1,420.51	667.90
Organizational Memberships Expenses	35.00	-
Travel Expenses	558.37	6,908.31
<b>Total Services Expenses</b>	<b>38,814.42</b>	<b>43,476.31</b>
<b>Total Expenses</b>	<b>38,814.42</b>	<b>43,476.31</b>
<b>Increase (Decrease) In Unrestricted Net Assets</b>	<b>(3,328.48)</b>	<b>(1,271.21)</b>
<b>TEMPORARILY RESTRICTED NET ASSETS</b>		
Net Assets Released From Donor Restrictions	-	-
Decreases In Temporarily Restricted Net Assets	-	-
Net Assets Released From Donor Restrictions	-	-
Decreases In Temporarily Restricted Net Assets	-	-
<b>TOTAL INCREASE (DECREASE) IN NET ASSETS</b>	<b>(3,328.48)</b>	<b>(1,271.21)</b>
NET ASSETS, beginning of period	31,757.96	33,029.17
<b>NET ASSETS, end of period</b>	<b>\$ 28,429.48</b>	<b>\$ 31,757.96</b>

## STATEMENT OF CASH FLOWS — For Year Ending December 31, 2009 and 2008

	2009	2008
<b>CASH FLOW FROM OPERATING ACTIVITIES</b>		
Increase (Decrease) In Net Assets	\$ (3,328.48)	\$ (1,271.21)
Adjustments To Reconcile Increase In Net Assets		
To Net Cash Provided (Used) By Operating Activities:		
Depreciation and Amortization	-	-
Book Value Of Assets Sold	-	-
(Increase) Decrease In Inventory	-	-
(Increase) Decrease In Advance Payment on Credit Card	971.34	(971.34)
Increase (Decrease) In Credit Card Payables	100.74	(205.81)
<b>NET CASH PROVIDED (USED) BY OPERATING ACTIVITIES</b>	<b>(2,256.40)</b>	<b>(2,451.36)</b>
<b>CASH FLOW FROM INVESTING ACTIVITIES</b>		
Acquisitions Of Property And Equipment	-	-
Disposition Of Property And Equipment	-	-
Purchase of Certificates Of Deposit	-	-
<b>NET CASH PROVIDED (USED) BY INVESTING ACTIVITIES</b>	<b>-</b>	<b>-</b>
<b>CASH FLOW FROM FINANCING ACTIVITIES</b>		
Proceeds From Additional Long-Term Debt	-	-
Proceeds From Additional Long-Term Debt	-	-
<b>NET CASH PROVIDED (USED) BY FINANCING ACTIVITIES</b>	<b>-</b>	<b>-</b>
<b>INCREASE (DECREASE) IN CASH</b>	<b>(2,256.40)</b>	<b>(2,451.36)</b>
CASH, beginning of period	30,786.62	33,237.98
<b>CASH, end of period</b>	<b>\$ 28,530.22</b>	<b>\$ 30,786.62</b>

## SUPPLEMENTAL SCHEDULE - EXPENSES — For Year Ending Dec. 31, 2009 and 2008

	2009	2008
<b>Administrative Expenses</b>		
Accounting Fees	\$ 1,550.00	\$ 1,650.00
Bank Fees	644.98	500.60
Credit Card Fees	631.46	791.58
Miscellaneous	386.34	1,350.72
Postage	311.88	278.84
Printing	-	360.00
Supplies	90.67	51.85
<b>Total Administrative Expenses</b>	<b>\$ 3,615.33</b>	<b>\$ 4,983.59</b>
<b>Journal Expenses</b>		
Claims	\$ 141.28	\$ 150.39
Distribution	901.58	93.30
Editing	621.20	586.16
Postage	4,452.29	1,934.60
Printing	10,145.84	4,970.31
QuickBooks Miscellaneous	366.34	196.90
Translation	279.50	128.75
Typesetting	9,336.16	8,823.34
<b>Total Journal Expenses</b>	<b>\$ 26,244.19</b>	<b>\$ 16,883.75</b>
<b>Membership Expenses</b>		
Dues Discount	\$ 605.50	\$ 407.00
Exchange Differences	53.11	-
Recruitment	75.00	260.90
Renewals	210.48	-
Website	476.42	-
<b>Total Membership Expenses</b>	<b>\$ 1,420.51</b>	<b>\$ 667.90</b>
<b>Travel Expenses</b>		
Editor	\$ -	\$ 1,439.08
President	558.37	2,222.76
Secretary & Treasurer	-	2,197.07
Other	-	1,049.40
<b>Total Travel Expenses</b>	<b>\$ 558.37</b>	<b>\$ 6,908.31</b>



**IAALD'S MISSION** is to enable its members to create, capture, access and disseminate information to achieve a more productive and sustainable use of the world's land, water, and renewable natural resources and contribute to improved livelihoods of rural communities.

*To further this mission:*

IAALD **CONNECTS** agricultural information specialists worldwide, providing platforms and spaces for information dissemination, exchange and knowledge sharing;

IAALD **CONVENES** agricultural information specialists worldwide, organising meetings and catalyzing dialogue among all agricultural information stakeholders;

IAALD **COMMUNICATES** and advocates the value of knowledge and information to its members and others, improving the status and practice of agricultural information management and dissemination;

IAALD **COLLABORATES** with members and other partner organisations, facilitating educational and other opportunities across agricultural information communities.

## Executive Committee of IAALD

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IAALD is a founding member  
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initiative — <http://www.ciard.net>

**Theme 1. INNOVATIVE LEARNING PROCESSES**

**Insight from a Farmer University in Brazil** / Emilie Coudel, Jean-Philippe Tonneau

Comment l'information peut-elle contribuer aux processus d'apprentissage innovants ?

Aperçu de l'expérience d'une université paysanne au Brésil

¿Cómo Puede la Información Contribuir a Procesos de Aprendizaje Innovadores?

Apreciaciones de una Universidad de Agricultores en Brasil

Développer un système innovant mixte de connaissances concernant des informations techniques, institutionnelles et traditionnelles pour renforcer les capacités et l'autonomisation de réseaux incluant diverses parties prenantes en Afrique rurale

Desarrollo de un Sistema Innovador de Conocimientos Mixtos de Información Técnica, Institucional y Tradicional para el Fortalecimiento de Capacidades y el Empoderamiento de Redes de Múltiples Interesados Directos en África Rural

**Theme 2. TARGETED INFORMATION PRODUCTS AND SERVICES**

Produits et services d'information ciblés : un équilibre à trouver entre les besoins des parties prenantes, l'apprentissage et la stratégie

Productos y Servicios de Información Dirigidos: Equilibrando las Necesidades de los Interesados Directos, el Aprendizaje y la Estrategia

Y a-t-il un futur pour les services conventionnels d'analyse de documents et d'indexation ?

¿Hay un Futuro para los Servicios Convencionales de Resúmenes e Indización?

**Theme 3. COMMUNICATION AND INFORMATION EXCHANGE BETWEEN ACTORS**

Intégrer l'utilisation d'un outil d'information multi-médias pour le travail des acteurs impliqués dans le développement de la production animale en Tanzanie ; diffusion, formation des utilisateurs, suivi et évaluation et impact.

Incorporación del Uso de una Herramienta de Información de Medios Mixtos en el Trabajo de los Actores Involucrados en el Desarrollo de la Producción Pecuaria en Tanzania: Difusión, Capacitación de Usuarios, Seguimiento y Evaluación, e Impacto

La documentation pour construire et partager les connaissances agroécologiques

Documentación para Construir y Compartir Conocimientos Agroecológicos

**Theme 4. INTEGRATED INFORMATION SYSTEMS**

The Observatory of Algerian Agronomic Research: an Integration of Scientific Collective Intelligence in the Development Process

El Observatorio de Investigación Agrícola Argelino: Una Integración de Inteligencia Científica Colectiva en el Proceso de Desarrollo

Partage des connaissances sur les meilleures pratiques pour la gestion des banques de gènes des cultures

Participación del Conocimiento sobre Mejores Prácticas para el Manejo de Bancos de Genes de Cultivos

**Theme 5. INFORMATION AS PUBLIC POLICY ENABLER**

Kathleen Flaherty, Nienke Beintema, and Gert-Jan Stads

Communiquer les indicateurs des sciences et technologies agricoles : leçons apprises

Comunicando Indicadores de Ciencia y Tecnología Agrícola: Lecciones Aprendidas

Thiendou Niang, Ndeye Coumba Fall

Capitalization Experiences and Institutional Innovation in West Africa

Experiencias de Capitalización e Innovación Institucional en África Occidental

